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Issue 051 November 2009

DOWNLOAD RESOURCES

- Free Low Poly Base Mesh
- Free Textures
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- Free Reference Movie

Interview
Alex Alvarez



The Gallery
Jose Alves da Silva, Maurice Panisch, Rory McLeish & more!



FREE Inside Look
Digital Art Masters: Volume 4
Project Overview by Jelmer Boskma



Project Overview
"Control Panel"
by Andrew Finch



Cover Image | Photoshop for 3D by Andrzej Sykut



$50 WORTH OF FREE GNOMON WORKSHOP TRAINING WHEN YOU BUY A 12 MONTH SUBSCRIPTION

IMPROVE YOUR 3D PIPELINE WITH PHOTOSHOP

Next-Gen Character Creation

The penultimate chapter of this tutorial series for 3ds Max, Maya, LW and **modo covers normal mapping and texturing**



Photoshop for 3D

Andrzej Sykut shows us the importance of Layer Masks & Adjustment Layers when improving our 3D renders in Photoshop



ZBrush "Manimal" Creation

Tomasz Kwiecinski brings us our interpretation of a "Reptilian-Man" – sculpted, textured and rendered in ZBrush – in the final chapter of the series



NEW!! Creating a Fantasy Scene

Using 3D, Photography and Post-Production, **Richard Tilbury kicks off our brand new tutorial series!**



Editorial

Welcome to Issue 51! If you're feeling that Christmas spirit already and you'd like to buy a friend or loved one a subscription to 3DCreative as a present, please email jo@3dtotal.com and she'll be happy to help. Or why not treat yourself (go on, you know you want to!)? If you purchase a 12-month subscription this month, you'll also receive **$50 USD worth of Gnomon tutorial content** with your subscription – **for free!** This comes courtesy of **Alex Alvarez**, the president of Gnomon and director of the Gnomon School of Visual Effects in Hollywood, The Gnomon Workshop, The Gnomon Gallery, Sketchtheatre, Gnomon Studios and CGChannel. We interview Alex in this month's issue as not only is he the founder and director of the before-mentioned, but he is also an accomplished 3D artist who continues to work on both personal and profession projects despite his extremely busy schedule. You'll find behind the scenes photos from the Gnomon School as well as Alex's portfolio of artworks on P.8. The subscription offer is for one month only, so purchase your subscription today to take advantage of the free gift from Gnomon: www.3dcreativemag.com

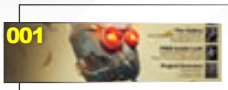
We're tackling the texturing of our Next-Gen characters this month in chapter five – the penultimate part – of 3DCreative's tutorial series for 3ds Max/Maya/LightWave and modo. **Joseph Harford**, **Gavin Goulden**, **James Busby** and **John Hayes** are all back and in top form to take you step-by-step through this leg of your character creation journey. These artists all work in the industry and know their stuff, so be sure to follow the tutorial for great techniques, tips and advice (if you've missed any of the previous chapters you can grab them at www.3dcreativemag.com/issues.htm) and create a next-gen character for your portfolio! (P.86)

Our front cover image was created by **Andrzej Sykut**, who is not only a talented 3D artist but also a great photographer – I've seen the proof! He has a wonderful eye for composition and detail, and as you'll see from the cover, a fantastic imagination to boot! Andrzej is with us to talk us through the benefits of using Layer Masks and Adjustment Layers in Photoshop to improve our 3D renders. Not only does Andrzej tell us what each Adjustment Layer is good for in our 3D workflow, but he has also kindly provided the PSD of his final image for you to dissect at your will. You can learn a great deal by looking at the structure of an accomplished image's layers, so we hope you'll find it useful and a great accompaniment to this month's chapter of the Photoshop for 3D series on P.40.

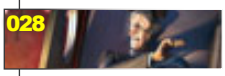
This month's Manimal comes straight from the mind of Polish 3D artist, **Tomasz Kwiecinski**. Tomasz has a great sense of humor and we love working with him and seeing what he comes up with when we give him a brief as strange as "Reptilian-Man". Check out his interpretation of such an amalgamation on P.50, and don't miss the free time-lapse movie with his tutorial for further insight into his ZBrush workflow. This is in fact the final chapter of our Manimal series, so we hope you've enjoyed the weird and wonderful creations over the past months! And as one good thing ends, another begins; we'll be bringing you a brand new series next month, so stay tuned to 3DCreative!

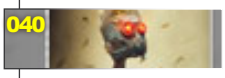
Talking of brand new tutorials, we'd like to announce the first chapter of a new five-part series on Creating a Fantasy Scene Using 3D, Photography and Post-Production. **Richard Tilbury**, our resident artist, is inspired by the local architecture of our hometown, Worcester (U.K.), and knocks up a concept for a fantastical scene using photographs of his chosen location in Photoshop. We'll introduce 3ds Max next month when we get to the modeling and lighting installment, but for now enjoying some good ol' concept art creation on P62.

Explore the gallery on P.28 and enjoy **Andrew Finch**'s first making of project on his recent gallery featured image, *Control Panel*, over on P.72. We've been really impressed with Andrew's work and we're sure you'll be seeing more of him in 3DCreative in 2010, so keep your eyes peeled. Happy reading! ED.


001 **Contents**
What's in this month?

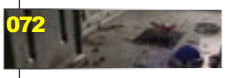

008 **Alex Alvarez**
Founder/Director/Owner of Gnomon


028 **The Gallery**
10 of the Best 3D Artworks


040 **Photoshop for 3D**
Part 5 – Layer Masks & Adjustment Layers


050 **"Manimal" Creation**
Part 6 – Reptilian-Man


062 **Creating a Fantasy Scene**
Using 3D, Photography & Post-Production – Part 1


072 **"Control Panel"**
Project Overview by Andrew Finch


079 **"Portrait of Keith Richards"**
Digital Art Masters: Volume 4 – Free Chapter


084 **About us**
3DTotal.com Ltd Information & Contacts


086 **Next-Gen Character**
Series for ZBrush, 3ds Max, LW, Maya & modo

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Free Stuff!
Wherever you see this symbol, click it to download resources, extras & even movies!





Get the most out of your Magazine!

If you're having problems viewing the double-page spreads that we feature in this magazine, follow this handy little guide on how to set up your PDF reader!







Setting up your PDF reader

For optimum viewing of the magazine, it is recommended that you have the latest Acrobat Reader installed. You can download it for free, here: DOWNLOAD!

To view the many double-page spreads featured in 3DCreative magazine, you can set the reader to display 'two-up', which will show double-page spreads as one large landscape image:

1. Open the magazine in Reader;
2. Go to the View menu, then Page Display;
3. Select Two-up Continuous, making sure that Show Cover Page is also selected.

That's it!

Contributing Artists

Every month many artists from around the world contribute to 3DCreative magazine. Here you can read all about them. If you would like to be a part of 3DCreative or 2DArtist magazines, please contact: lynette@3dtotal.com

Next Gen Character



This tutorial series provides a comprehensive guide through the process of creating a 3D character intended for use within a next-gen console environment. **Joseph Harford, Gavin Goulden, James Busby** and **John Hayes** tackle this new series providing versions for 3ds Max, LightWave, Maya, and modo



Richard Tilbury



Has had a passion for drawing since being a couple of feet tall. He studied fine art and was eventually led into the realm of computers several years ago. His brushes have slowly been dissolving in white spirit since the late 90s and now his graphics tablet has become their successor. He still sketches regularly, balancing his time between 2D and 3D.

www.richardtilburyart.com

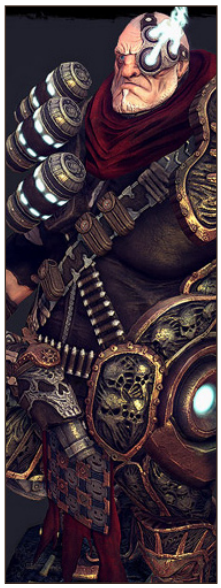


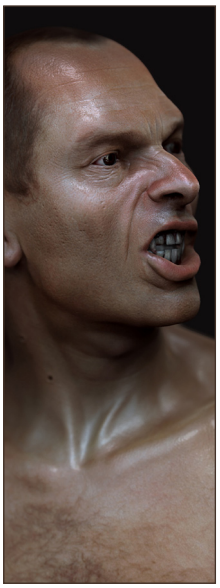
Gavin Goulden

Freelance Character Artist based in Vancouver, BC. He has several years' experience ranging from mobile to next generation games, and specialises in creating high detailed characters. He has contributed multiple tutorials to the community, and can often be seen posting on game art forums and participating in game art competitions.

www.gavimage.com

gavin@gavimage.com





Joseph Harford



An avid artist since childhood; after freelancing in advertising and film he worked in the games industry at Crytek GMBH, the German games company behind *Far Cry* and *Crysis*. He later moved to Ubisoft as a senior character artist, and has since founded ShineLabs, a digital asset and artwork company, where he currently works.

www.josephharford.com

www.shine-labs.com



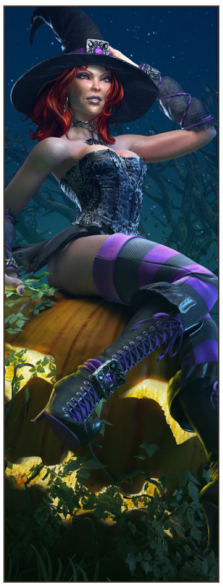
James Busby

After working in the industry for about seven years on everything from games to television ads, James setup his own Sheffield based company, Ten24.info, in 2008, which provides assets for all sectors of the media. He hopes his version of the next-gen tutorial series will be useful to those wanting to pick up LightWave as a character modeling tool.

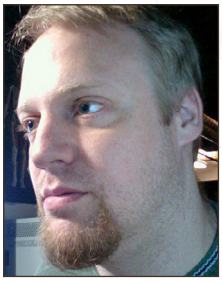
www.ten24.info

jamie@ten24.info



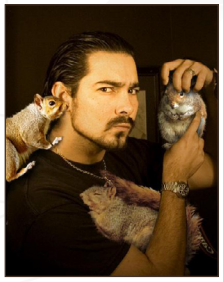


John Hayes



Coming from a 2D background, John started in game development in 1996 as a concept artist and character artist. The first few Nintendo games improved his 3D digital skills and techniques for game development. He then joined Capcom as a senior character artist, moving into character lead, followed by his role at Sega as senior character artist and then character art lead.

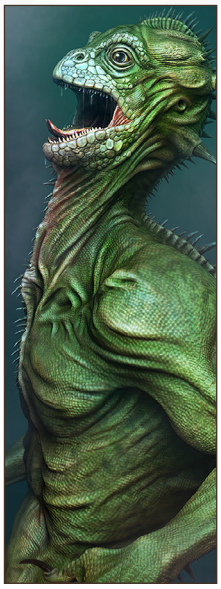
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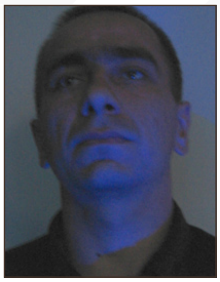
ALEX ALVAREZ

The director of the Gnomon School of Visual Effects in Hollywood, The Gnomon Workshop, The Gnomon Gallery, Sketchtheatre, Gnomon Studios and CGChannel. Alex has dedicated the last decade to educating students and professional artists around the world, whilst helping to change the face of computer graphics and the design education! www.alexalvarez.com
www.thegnomonworkshop.com





TOMASZ KWIECINSKI



A freelance 3D modeler in Poland who started playing with 3D around 10 years ago, with 3ds Max 2.5. He's always been interested in organic modeling and creating characters, and when he discovered ZBrush he was immediately addicted! Even though he still uses 3ds Max today, he can't imagine organic modeling without ZBrush now!

mafida@neostrada.pl



ANDREW FINCH

Aged 27 and living in the great city of Birmingham in the U.K., Andrew has a degree in 3D Animation which inspired his passion for environment art. He now works as an environment artist at Rebellion, and says, "Working in the games industry is exciting: you never know what the next project will be and there's always something new to learn. This helps to keep you creative and grow as an artist." afinchy@googlemail.com



WOULD YOU LIKE TO CONTRIBUTE TO 3DCREATIVE OR 2DARTIST MAGAZINE?

We are always looking for tutorial artists, gallery submissions, potential interviewees, 'making of' writers, and more.
For more information, please send a link to your work to:
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Interview | Alex Alvarez Founder/Director/Owner of Gnomon



ARE YOU AN ASPIRING ARTIST?

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Student work by **Nitin Garg**

Gnomon School of Visual Effects Specializes in Training in High-End Computer Graphics for the Entertainment Industries.

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Mix and match courses to meet your career goals. We specialize in supplying students, professionals, and production studios with the skills they need to succeed in the animation and effects for film, television and game industries.

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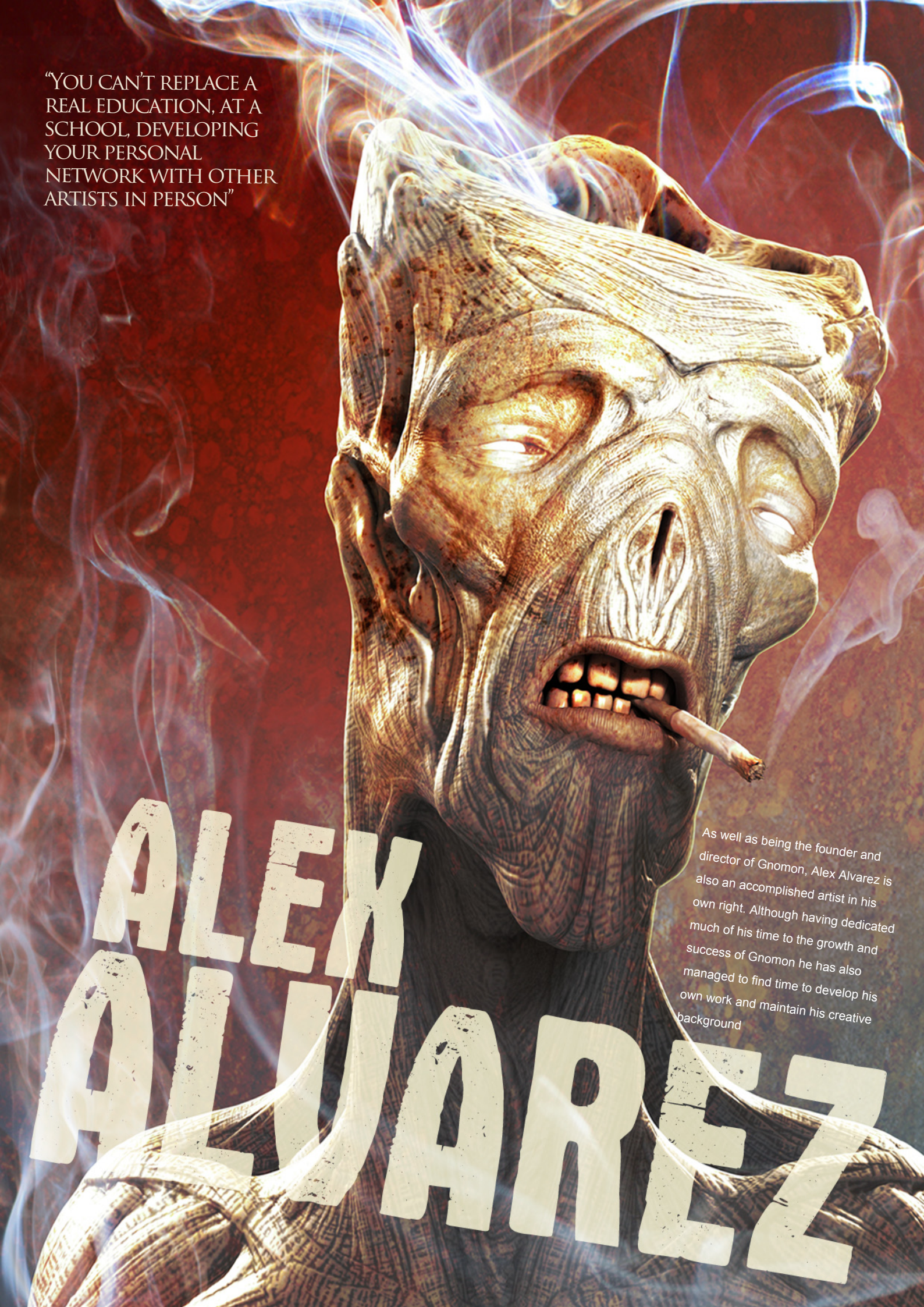
›› CHARACTER TEXTURING AND RENDERING ‹‹
CHAPTER 5: TEXTURING, PART 4 WITH ALEX ALVAREZ | Maya, ZBrush, Photoshop

›› CREATURE HEAD TEXTURE LOOK DEV ‹‹
CHAPTER 4: TEXTURE LOOK DEV 01 WITH ALEX ALVAREZ | Maya, Photoshop

›› AN OVERVIEW OF TOPOLOGY IN ZBRUSH ‹‹
WITH RYAN KINGSLIEN | Maya, Photoshop

›› LIGHTING AND RENDERING ‹‹
INDIRECT ILLUMINATION – GLOBAL ILLUMINATION WITH JEFF PATTON | 3ds Max




"YOU CAN'T REPLACE A REAL EDUCATION, AT A SCHOOL, DEVELOPING YOUR PERSONAL NETWORK WITH OTHER ARTISTS IN PERSON"
ALEX ALVAREZ
As well as being the founder and director of Gnomon, Alex Alvarez is also an accomplished artist in his own right. Although having dedicated much of his time to the growth and success of Gnomon he has also managed to find time to develop his own work and maintain his creative background

Interview with Alex Alvarez



You're probably best known for being the founder of Gnomon, which has become globally recognized as a principal source of training within the CG industry. Your library of products covers a very wide array of subjects, but what is it about the company you are most proud of?

Ah... well, a lot of people around the world focus on The Gnomon Workshop DVDs, as that is what is readily available to them, but Gnomon at its core is about the Gnomon School - and a few other things. This may be a long answer [Laughs]!

The Gnomon School was founded in 1997 as a professional VFX training facility in Hollywood, offering courses on an "extension" basis, which meant that people could sign up for just one class. At the time, I was working as an Applications Engineer for Alias|Wavefront, supporting studios around LA with PowerAnimator training and technical solutions. I was also working with Maya at that time, which was in pre-release Alpha. The demand for my time was very high, and although I was rather young, it was clear that there was a strong need for something like Gnomon in Hollywood. Also be aware that at that time everything was run on Silicon Graphics (SGI) computers, so the cost of hardware/software was around $150k per





workstation! Because of this, very few people had access, while at the same time the industry was growing fast and there was a great need for more talent. I approached several artists and studios asking if they would support a school, and was very fortunate to receive a very positive reaction.

Since that time, our student population has been a mixture of both professionals looking to develop their skills and adults looking to enter the industry. In 1998 we launched our full-time two-year program to develop 3D generalists for the VFX industry, which has now evolved to integrate gaming, and today we have roughly 300 students, combining full-time and extension, and about 70 instructors who are all working artists from studios around Los Angeles including Sony Imageworks, Digital Domain, Rhythm and Hues, Zoic Studios, Blizzard Entertainment and many more. We are extremely proud of the quality of our students, instructors and curriculum, knowing that through Gnomon thousands of artists have learned the skills that they needed. Via our full-time program we have the highest placement rate of any school that I am aware of, being over 90% within six months of graduation. Thanks to all the hard work of our staff and faculty, it makes me very proud to know that Gnomon has helped scores of people accomplish their goals.



The Gnomon Workshop was founded in 2000 as a sister company to the Gnomon School. While clearly the school was catering primarily to artists in Los Angeles, I have always been very interested and involved with various online communities. Gnomon was one of the first advertisers and supporters of sites such as CG Channel, CGTalk, CGSociety, Highend3d, 3DTotal, etc. I was always very aware that these communities were immensely valuable and would transform the industry, as they have. Through this involvement I really wanted to be able to share what was going on at the Gnomon School with the global community of artists. Furthermore, there are many top artists in the industry who are, due to their busy schedules, too swamped to be able to commit to teaching a class at the school. The DVDs offered a solution whereby we could share information with a wider audience, while still getting the chance to work with some of these amazing artists.

Aside from being able to help artists evolve and grow via our educational services, one of the things I am definitely most proud of is to have been able to work one-on-one with such top artists as Syd Mead, Ryan Church, Iain McCaig, Carlos Huante, etc on the development of their DVDs. It has truly been an honor to get to work with such industry giants.

So aside from the school and the workshop, Gnomon is also involved in a variety of other things that I am very excited about. Last year we launched the Gnomon Gallery, which focuses on the arts of the entertainment industry. Every month we have a new show and big opening party to celebrate the amazing talent that I have come to know over the years. One would think that there would already have been such a gallery, but due to the nature of the gallery scene in LA this has never really taken off. The shows in the gallery have been a big success and we are very proud to be able to host them... including artists such as Taron, Meats Meier, Jordu Schell, Christian Lorenz Scheurer, Aaron Sims, group shows with artists from Blur and Blizzard, and our most current show being the “Art of 9”, the new film by Shane Acker.



Something that not a lot of people are aware of is that in 2008 Gnomon acquired CG Channel. It was brought to my attention that the site was having some difficulties and needed to be acquired or shut down. We decided that Gnomon would be able to manage the site and given the fact that we have so many professionals coming to Gnomon every week, that we would be able to begin focusing the site more on editorial video content, such as interviews, production spotlights, trade show coverage, etc. There is still a lot to do with CG Channel as the site really needs a complete overhaul, but we look forward to developing it over the coming years with the main focus being editorial. There are many great communities out there such as 3DTotal, and we definitely have no aspirations to reinvent the wheel when it comes to this. But being in LA, we feel that the main thing we can offer the community is more exposure to what is going on in the LA industry via video-based content.



Then there is Sketch Theatre, a site launched at the end of 2007. The purpose of Sketch Theatre, as an entirely free, video-based site, is to expose as many people as possible to the fact that there are many career opportunities for people who like to draw. Every week we have artists come to Gnomon to simply create a cool drawing on camera. We then ask the artist what kind of music they are into, contact bands, and then time-lapse the video of the drawing to the length of a song. Sketch Theatre is a fun site to visit and get a quick dose of inspiration. The education system in the United States, and in most parts of the world, is a big mess right now. Budgets are being cut like crazy. In California alone over $16billion was cut in 2008 from education, $400million just in Los Angeles.


LOUNGE



What this means is that the first thing to go is the arts and music. It is really horrible and sad to think that thousands of kids are losing their exposure to the arts. But at the same time, today is probably the best time in history to be an artist. There are so many opportunities for talented people, and I felt that we needed to do something to help share the fact that if you like to draw, it is ok - there are many, many people who have been able to develop their love of art into a career, regardless of what their parents or school systems may have said! We have received tremendous support and feedback from artists from a variety of fields including film, games, animation, fine-arts, tattooing, etc. Sketch Theatre also expresses the relationship between art and music as mutually inspirational fields, and we also have had great support from the music industry.



Gnomon has also had an active "resident artist" program for several years, which has included such artists as Meats Meier, Eric Hanson, Jeremy Engleman, Sil van der Woerd, Ryan Kingslien and now the director Shane Acker. Through this program we have offered these artists an opportunity to focus full-time on the development of their own personal artwork. We recently completed work on the music video *White Swan*, which was a collaboration between Sil and several of our students at Gnomon. I think they really put together an extremely unique and beautiful piece, and I can't be more proud of Gnomon's involvement in that.

Today we are thrilled to have Shane Acker join us in the development of his new short film *Plus Minus*. A few years ago Shane actually accepted the resident artist position not long after having completed his short film *9*, but a week later he got a call from Tim Burton to develop *9* into a feature ... [Laughs]. So of course I was very excited for him and now that the film is done, I was thrilled to hear that he still wanted to come to Gnomon. Over the next few months we will be developing *Plus Minus* in conjunction with a variety of students and professionals... very exciting!

And finally, our current big news is the development of Gnomon Studios. As my fourth company, it can be said that I am pulled in a lot of directions, but this is something that I am very dedicated to developing into something wonderful. I am very fortunate to have an amazing staff amongst the Gnomon companies, allowing me to continue to develop new projects, which really has become my role. The Gnomon



Studios will initially focus on the development of Shane Acker's short film, but we will also be working on a variety of projects doing VFX, creature work, and preproduction design visualization... as well as other short films. This will be an amazing opportunity for our students to get some production experience prior to graduation, while further developing our mission to be a creative and professional environment. Stay tuned!



Do you believe you will ever reach a saturation point with regards to the topics you can adapt to DVD or do you feel the evolution of new software will continually supply new content?

The Gnomon School offers about sixty courses every term, both in Hollywood and online, and The Gnomon Workshop library has over 200 titles. So yes, there is a lot of information to be gained from all of that... but of course, the industry continues to evolve. New tools and techniques are always being developed and it is our job to stay on top of that. For this reason we will always continue to develop our curriculum, add new classes and, of course, continue to release new DVDs. The rate at which we release DVDs, however, has slowed down. This is primarily due to the absolutely insane amount of piracy that exists today. While top





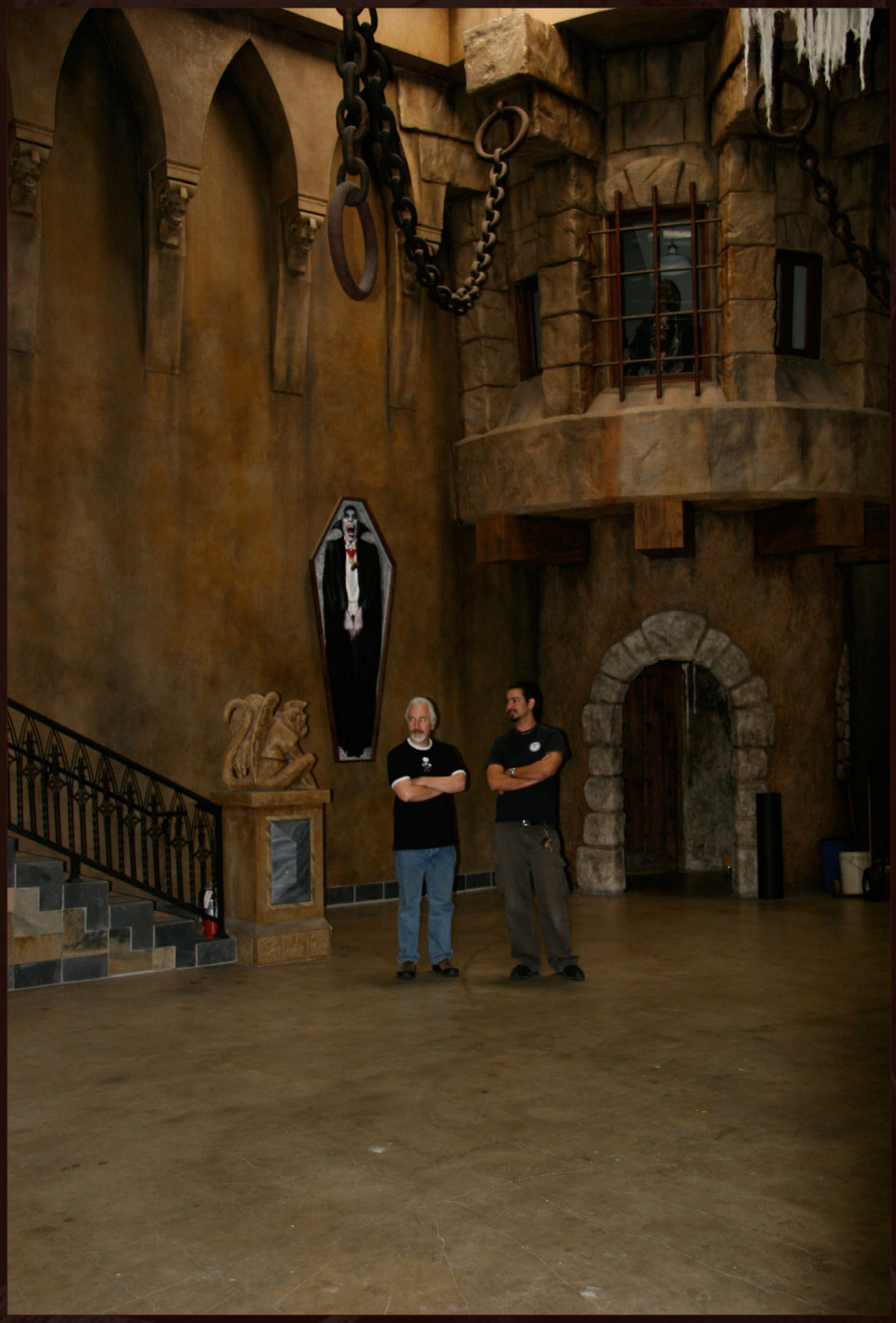
artists used to be appropriately compensated by the sale of DVDs, today it seems that most people feel that it is ok to just grab our titles from torrent sites. This has had a major impact on the entertainment industries, meaning film and music, but of course impacts us in a big way as well. If people are going to just pirate everything, Gnomon will just focus on other things. Sad but true. There are still, however, many people who do not believe in piracy and support us, and for this we are grateful... so for the time being, The Gnomon Workshop will continue to produce titles. I know that other companies such as Lynda.com, Digital Tutors, Total Training, etc are also all over the torrent sites... but if Hollywood with all their money can't figure it out, what are we going to do? If you are reading this and have a bunch of pirated stuff on your hard drive, just be aware that I understand why you do it, but in the end by not supporting the content creators, you are limiting how much content gets made.




XII
INRI

On a positive note, the Gnomon School is busier than we've ever been. You can't replace a real education, at a school, developing your personal network with other artists in person and benefitting from the great efforts we take with job placement. We are determined to continue to offer the best education that we can in order to give artists the opportunity to realize their full potential. Education has been my career for over twelve years and I am very proud to be in a position to help people; extremely proud.

Gnomon exists to be the school that I was looking for when I was a student searching for somewhere to develop myself as an artist, learn 3D, Visual Effects, Gaming, etc. For this reason, I think Gnomon will continue to be extremely unique. We are not run by suits who just care about profits and could care less about quality. Gnomon is an artist-run facility, developed by artists, for artists. Most other schools are unethical and have no problem lying to their applicants, which is really a shame.





Do you feel your artistic background has been an invaluable part of Gnomon's success?

Very much so. As I mentioned earlier, Gnomon has been developed based on my own vision of what an ideal learning environment would be. From the design of our furniture (all designed in Maya and custom built), to the artwork on the walls, to the caliber of our instructors, Gnomon is meant to inspire and motivate artists to create.

Being an artist is a lifelong pursuit, where you are continually aware of your own weaknesses and strive to improve upon them. Whether you are 22 or 72, this is something that I have discovered to be a universal constant amongst successful artists. Furthermore I am just as fascinated and excited by the tools, techniques and potential of our industry as I have ever been, and think that this enthusiasm is felt and appreciated by Gnomon's staff, faculty and students. Gnomon at its core is an art school, where visual effects, animation and gaming happen to be the medium. Should a medical school be run by an engineer? With this logic, how could a school like Gnomon be run by someone who isn't himself as involved in or excited by our industry as our students hope to be?

When I was in art school, I was continually frustrated by the fact that all of my instructors were "staff" instructors - people who really were

no longer part of the industry and were not doing what I wanted to do. While well-intentioned, they did not inspire me. In the end I had to be self-motivated and feed off the energy of my fellow classmates. I wanted to create something better than that and, while Gnomon is still in a continual state of evolution, I think that we are on the right path, with the correct motivation.

Tell us a little about your experience working on *Avatar* and the kinds of things it taught you.

In 2006 I was contacted by Neville Page, the lead creature designer for *Avatar*, who asked if I could recommend a 3D artist for the Art Department. I had worked with Neville on the production of his DVDs and, being familiar with Gnomon, he was wondering if I knew a 3D artist who could help the creature department visualize their designs in 3D. At that time the creature department consisted of Neville, Yuri Bartoli and Tully Summers, who were all working either on paper, in clay or in Photoshop. This, of course, sounded like an amazing opportunity and I immediately began mulling it over. While I was very busy with Gnomon, in 1998 I remembered getting offers to work at Weta on *The Lord of the Rings*, which drove me crazy. I was, and still am, a huge fan of the books, and wish I could have been part of the crew on that but Gnomon was just too new for me to disappear. But when *Avatar* became available, knowing that this was going to be an epic film, I gave it a lot of thought. I talked to the crew at Gnomon, and determined

that if I left for a few months that Gnomon would probably be just fine. I mentioned my interest to Neville and got the job.

I worked full-time at Lightstorm on *Avatar* for six months up until May 2007, when the creature art department wrapped and made the final delivery to Weta. During that time I was part of the small beta team for ZBrush 3.0 and helped integrate ZBrush into the design process for Neville, Yuri and Tully. I worked on a bunch of the creatures, shared an office with Neville, got to sit one-on-one with James Cameron many times and really had an amazing experience.

My job consisted of taking the designs and building them in 3D, including texturing, shading, lighting, rigging, animation, effects and integration into matte paintings/ environments. This process would help inform the designers and the Director as to how well the creature designs were working, what the key poses would be, etc. Working as a 3D artist surrounded by designers was a great learning experience, as their skill and speed definitely forced me into a mode of trying to also be as fast and efficient as possible. But a solid lesson learned was how Neville used Photoshop to explore possible textures and styles for the creatures. He could fill a wall with prints of possible directions in a day. More importantly, however, was learning how incredibly academic, researched and iterative the design process can be when you have a director like Cameron who is simply not satisfied until what he sees matches perfectly with what he envisions.

Being surrounded by so many phenomenal designers on *Avatar* was extremely inspiring, as Lightstorm assembled an amazing team of artists including Jordu Schell, Ryan Church, Dylan Cole, James Clyne, Ben Procter and scores more. The amount of design work that has gone into *Avatar* is epic and I, like many others, can't wait until December 18th. I feel grateful to have been able to work on a small part of it.



You must have been able to pick up quite a treasury of tips and tricks from the various professionals that have visited Gnomon over the years. Can you share with us some of the most memorable advice you have received and techniques you have picked up that have proven significant to your own development as an artist?

Jeez, there is so much that could be said here. As I've stated before, there is more to learn about design, nature, software, etc than any one person could learn in a lifetime. Over the years I have had the privilege of working with so many amazing artists and each of them have influenced me in different ways. From the development of Gnomon's curriculum, to our



DVDs, to working on personal and professional projects, I continue to be made aware of how much more there is to learn in order to feel that I can create what is in my mind... while also trying to expand the range of what is in my head through reading, traveling, movies, games and so on. With that said, I would say that the search for inspiration and motivation is of the utmost importance. To not become complacent; to not be someone who spends their evenings and weekends lounging on a couch staring at the television. I am in a constant work mode, except for the time spent with my kids. Not to say that everyone should be like this, as it is not really the most balanced life, it is just who I am. Luckily, however, I have a great girlfriend, Sofia Vale Cruz, who is into this stuff too - she's a 3D environment artist at Blizzard Cinematics.

"EVERYTHING THAT WE CREATE IS BASED ON NATURE AND THE MYRIAD WORKS OF MAN THAT HAVE COME BEFORE US."

The people you surround yourself with make a big impact on who you become. When I have spent time with people like Syd Mead or Iain McCaig, and experienced their incredible charisma and enthusiasm for what they do, after decades of working, I feel excited to know that people can stay motivated and inspired. I've met a lot of artists who have become a little bitter and burned out from the long hours of the industry, so it is good to know that there are others that rise above the frustration and commit to their passion for being creative. I am very much inspired by them.

As far as something more specific, I would say that one of the biggest things to be learned from working with top artists is the universal dependence on reference material and

knowing your art/design/architectural/etc history. In the production world there is always going to be a time constraint and you have to learn to work within those parameters. Things are never done, they are due... if you know what I mean. Furthermore, everything that we create is based on nature and the myriad works of man that have come before us. We simply recombine these things in new ways. A lot of students tend to think that they need to be able to create things from their head. While it is true that the more you can depend on memory, the faster you will work and the more creative you will be, you cannot start off this way. Use references. Absorb what you learn from them. You will always need references when asked to do something you haven't done before, but at the same time your memory banks will grow and you will get better, faster and more valuable to production.

Your 3D portfolio is composed of some bizarre and, might I say, macabre creatures. What sorts of things inspire them and where do you draw your inspiration in general?

This is such a common question with interviews, and we of course ask it a lot too, with interviews at The Gnomon Workshop and CG Channel. I've found that it is often a difficult question for artists to answer - many artists just like what they like and don't really know why. We are all a result of decades of life experience, and it is hard to know why we end up being attracted to the things we are. My mom and family in general think that the stuff I make and artwork I collect is ugly and a sign of a disturbed individual. I dunno why I think skulls are cool, but I do, and I own a bunch of them. My high-school textbooks are full of doodles of skulls, demons, etc. (I kept a bunch of them to remind myself that I have always been weird. Proudly so). Of course, some of my favorite artists are Wayne Barlowe, Zdzislaw Beksinski, Chet Zar, Cam de Leon, Brom, but also artists such as Caravaggio, Rembrandt, Michelangelo, Rodin, Dali, or lowbrow artists such as Glenn Barr, Mark Ryden and Robert Williams.





I have also always been a big gamer, going back to my Atari 800 that I got in 1982, and the thousands of hours I have spent playing games such as *Wizardry*, *Ultima*, *Bard's Tale* (80's games), to current games like *Bioshock*, everything from Blizzard (although I am happy to say that I have finally stopped playing *World of Warcraft*... jeez), have all influenced me in a variety of ways. I love fantasy, especially dark fantasy. My favorite films are *Bladerunner* and *Jacob's Ladder*, so there you go. Kind of a vague answer to the question, but as best as I think I can do.

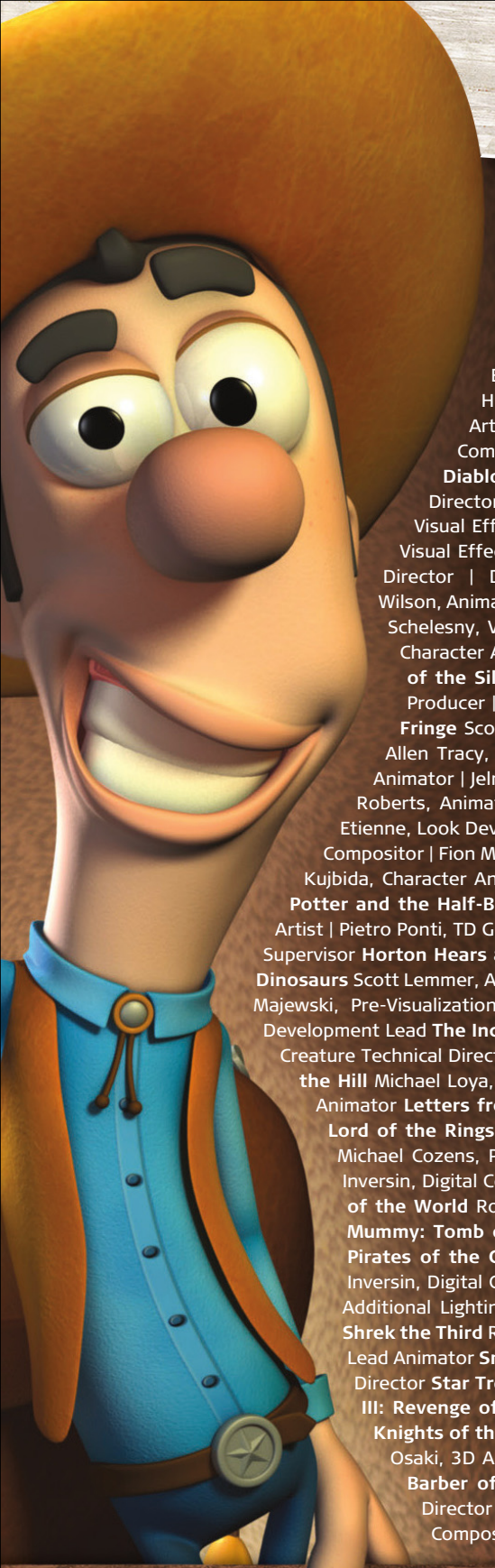
If you didn't have Gnomon what other job would you ideally like to be doing?

I often get asked if I am going to sell Gnomon one day. We have been approached several times by companies who want to buy us, or open Gnomon in other cities, and turn us into some sort of chain-school factory. I love Gnomon; I feel extremely fortunate to be able to be surrounded by such creative energy every day from our students and the professionals that we work with. I am excited by all of the new projects we have going on, especially Gnomon Studios and the new Shane Acker project. So the thought of not having Gnomon... well, I choose not to think about. If I am forced to answer the question then the answer would be that I would probably open a studio and start making short films with talented artists and directors. But we're already doing that... [Laughs]. Well, as far as the industry goes, I would probably be a freelance creature/character/generalist and do more work like I've been doing with Neville Page, who I continue to work with on creature development projects for film. Outside of the industry... well, I guess it would be nice to have a restaurant on the beach in the Bahamas and get better at playing the piano. When I'm seventy!

Alex Alvarez

For more work by this artist please visit:
http://www.alexalvarez.com
http://www.thegnomonworkshop.com
Or contact them at:
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Interviewed by: Richard Tilbury





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THE GALLERY

This Month we Feature Artwork From:

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Ruslan ‘ars’ Anisimov
Eric Zhang
Shane Dale
Daniil V. Alikov
Rory McLeish
Gene Erh Teh
Jan K. Vollmer
Maurice Panisch
Jamie Cardoso



STILL LIFE WITH BLACK PEPPER

Daniil V. Alikov
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MENTAL RAY AERIAL VIEW

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Cross of Iron

Eric Zhang

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V8

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Secret Agent

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Image created for CG Challenge, 'Secret Agent', www.CGSociety.org





Flip to Page 086 for the fifth part of our new Mega Tutorial Series

NEXT GEN CHARACTER CREATION SERIES

This series of tutorials provides a comprehensive guide through the process of creating a 3D character intended for use within a next gen console environment. As such, the design of the model will be tailored towards the eventual aim of functioning within a game engine and viewed in real-time. The series will cover all of the key stages of the 3D pipeline from sculpting the initial mesh in ZBrush and optimizing it in the principal 3D packages, through to texturing and applying next gen shaders. The inclusion of ZBrush tutorials will address the methods of sculpting both a low-poly mesh as well as a highly detailed version used to generate a normal map, and accompany the remaining software specific chapters that will detail topics that cover mapping, materials, lighting and rendering.

Follow

This chapter deals with the texturing part of the series and looks at how to generate normal maps, baking out lighting effects, and the techniques of painting in Photoshop using the aid of photographic reference. Seamlessly blending in photo references with hand painted techniques are a feature, as well as a section on painting eyes.

So if your interested in seeing the fifth chapter of this amazing new series, please flip to the back of this magazine and enjoy.

3DSMAX | PAGE 086
LIGHTWAVE | PAGE 122
MAYA | PAGE 158
MODO | PAGE 182

ZBRUSH 3ds max lightwave MAYA modo

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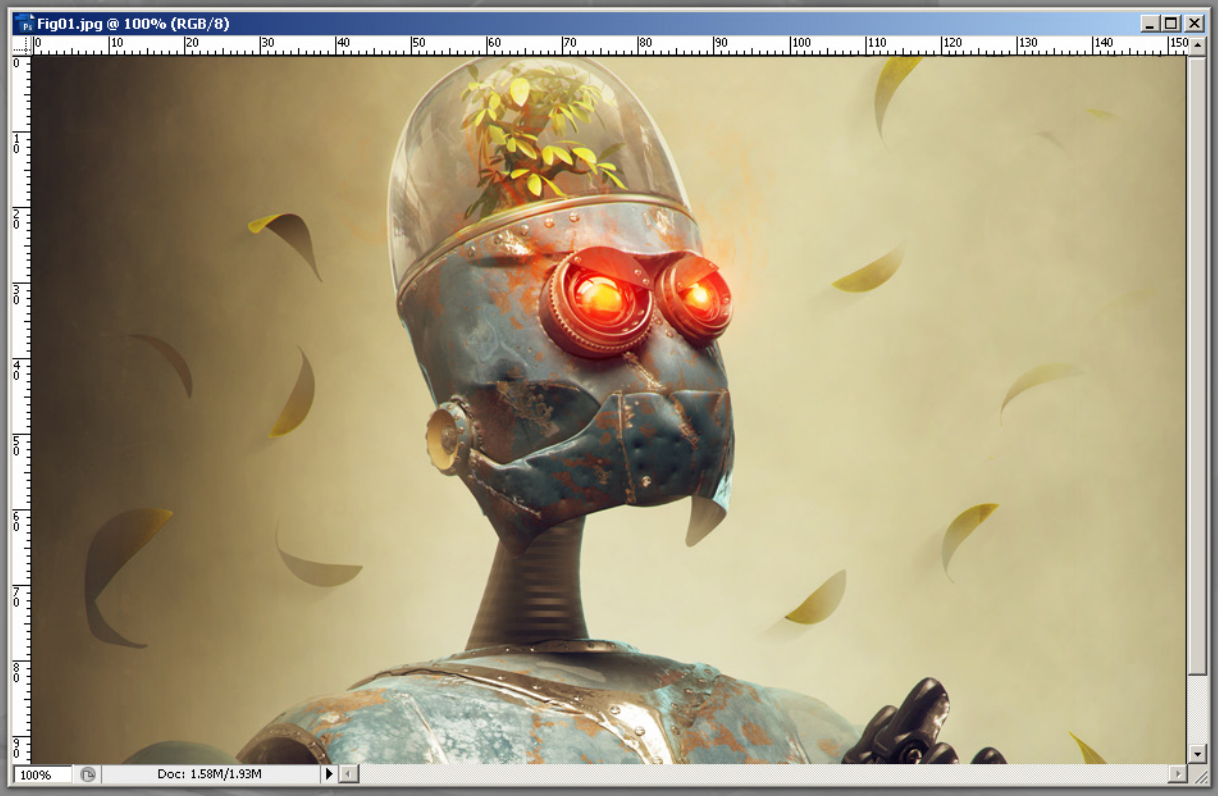


- Free PSD of image layers

"The great thing about it is that you can do a lot of the editing in a non-destructive, dynamic way using Adjustment Layers. This opens up some interesting workflows."

Photoshop for 3D

This series of tutorials aims to show the value of post-production and more specifically the ways in which Photoshop can be used to aid the 3D pipeline. Over the course of six chapters we shall focus on the various tools and techniques on offer in Photoshop that are frequently used to improve 3D renders. Compositing passes, adding particle effects, improving lighting and making general colour adjustments are a few of the topics covered, as well as ways to create backgrounds that both complement and enhance characters. The methods presented within this series can provide an efficient alternative to lengthy render tests and experimenting with numerous settings, and will enable artists to seamlessly blend 2D techniques into a 3D process, resulting in a versatile and streamlined workflow.



Chapter 1
Render Passes

Chapter 2
Retouching Final Renders

Chapter 3
Lighting & Special Effects

Chapter 4
Curves, Levels, Colour Balance & Layer Styles

Chapter 5: Layer Masks & Adjustment Layers

Adjustment layers are a non-destructive form of editing which allow users to tweak all sorts of image aspects, from the Color Balance and Hue/Saturation through to the Brightness and Contrast. This tutorial describes their value in conjunction with Layer Masks to show how renders can be altered in a number of ways to improve specific elements such as lighting and colour range, and yet be fully reversible

Chapter 6
Creating Backgrounds

PART 5 - LAYER MASKS & ADJUSTMENT LAYERS

Software Used: Photoshop

I don't think a 3D image should be called complete without some post-production in 2D. It can range from simple color correction and the adjustment of brightness and contrast, to a much more complex process in which you can totally change the look of an image.

The most popular tool for the job is of course Photoshop. The great thing about it is that you can do a lot of the editing in a non-destructive, dynamic way using Adjustment Layers. This opens up some interesting workflows. For example, you can work out the color correction on the low resolution test render early in the process, and just move the layers to the final high-resolution image at the end. Or you can process a series of images for the same consistent look by using the same set of adjustment layers on all of them. This is great if you have to show the same scene from many angles. Not to mention the ease of going back and changing things if you or your client decides that the background is too dark, for example. Or not needing to redo the entire process if you change your scene around and re-render it. Sounds nice, doesn't it? So nice in fact that after a while you can't work without adjustment layers at all!

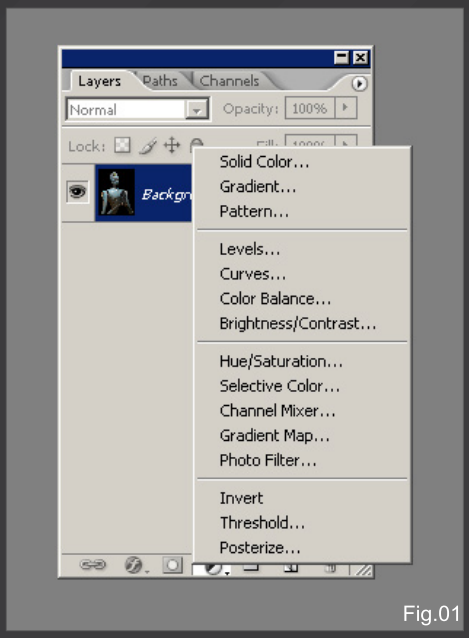
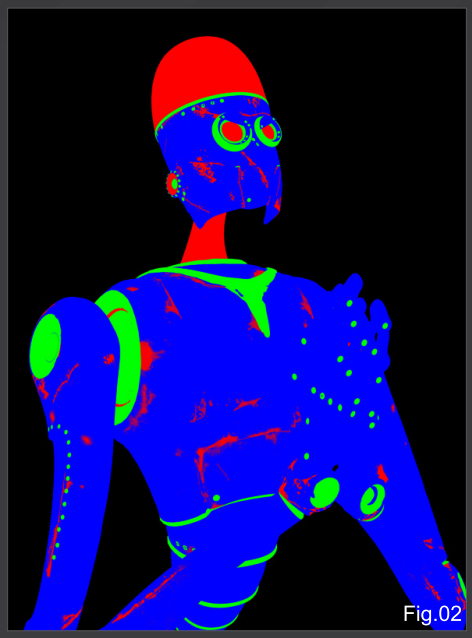


Fig.01


Fig.02

Photoshop CS2 has 15 kinds of Adjustment Layers (Fig.01). Newer ones possibly have more, but not all of them are actually useful when processing 3D images. Every Adjustment Layer has a Layer Mask attached to it. That way you can decide which parts of the image should be affected.

When working with 3D images it's very convenient to render a RGB mask pass (Fig.02). This makes selecting the parts you want to tweak much, much easier.

Now for the layers themselves:

Solid Color is great as a background base, or as a colored overlay on top of the image (Fig.03).

Gradient is a nice tool for vignettes, to darken the sky a bit, or as a starting point for the background. Personally I more often use old Gradient Fill tool – when creating a vignette, it's usually faster to draw the gradient four times in the image corners on a single layer, than to create four separate gradient layers. But this varies from image to image (Fig.04).

Pattern is most useful for texture overlays, using tileable textures. The ability to change the tiling comes in handy in many cases (Fig.05).

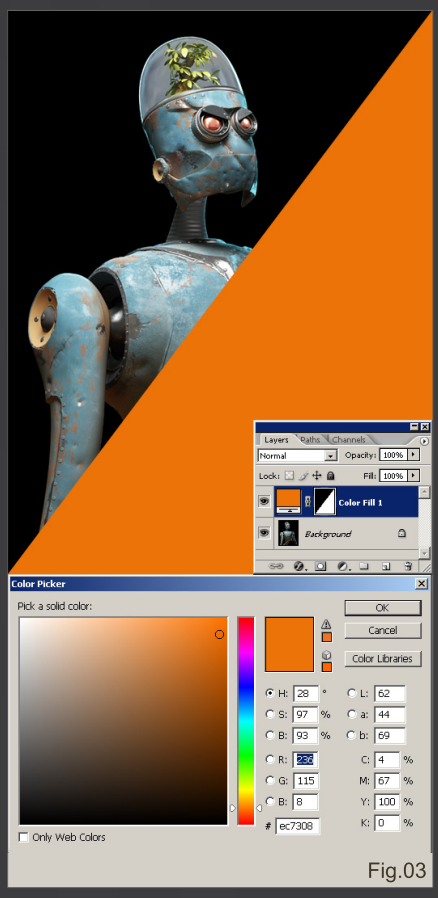


Fig.03

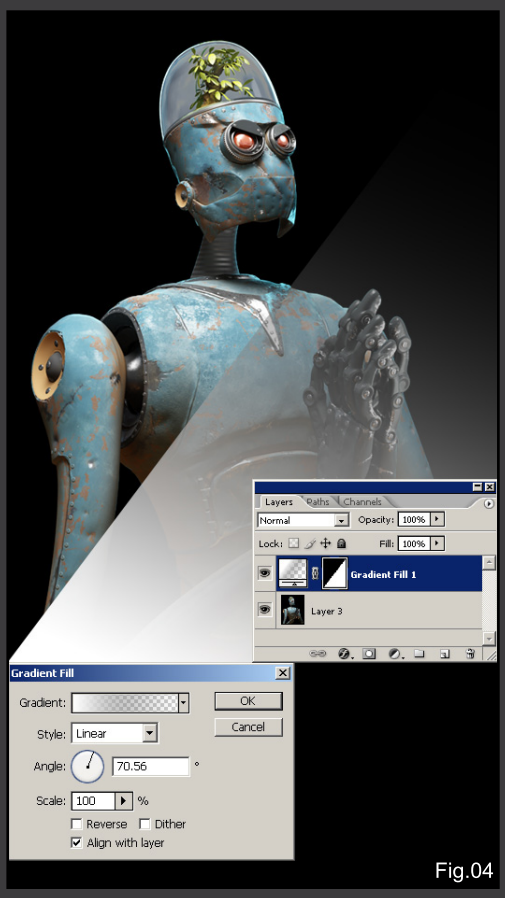


Fig.04

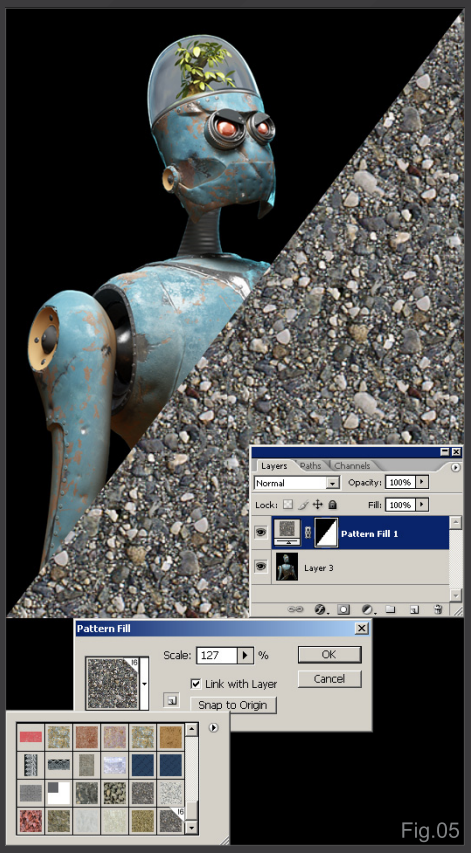


Fig.05

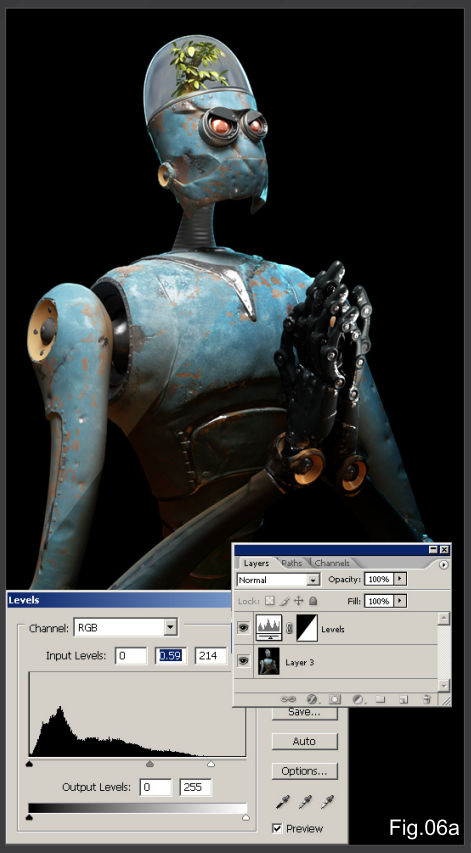


Fig.06a

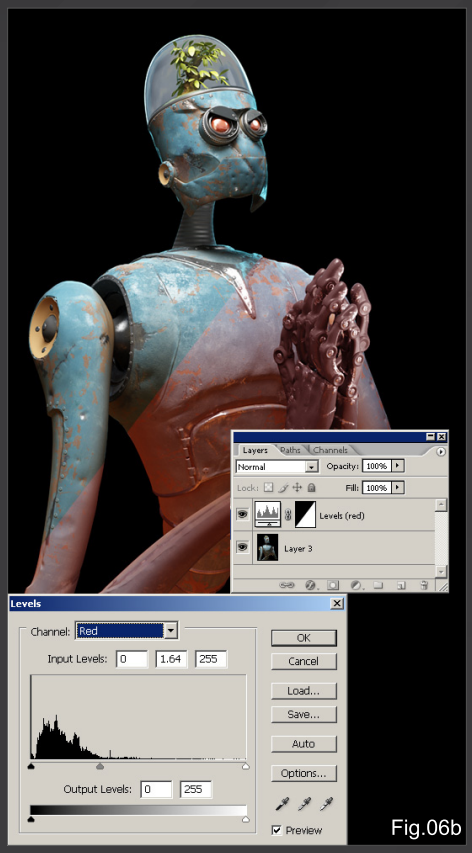


Fig.06b

Levels allow you to adjust brightness, contrast, gamma (Fig.06a) and make some color correction, since it can work on either the whole image or individually on RGB channels (Fig.06b). You can either change the position of the sliders uder the histogram or use color pickers to decide which part of the image should be white, black, or somewhere in the middle. Levels are not quite as powerful as Curves, but probably easier and more intuitive to use in some ways, due to the displayed histogram.

Curves allow you to do everything Levels do, plus much more. This is because you can shape the curve in the way you wish. If you feel the shadows need to be warmer, you just change the curve in the lower part of the red channel. If you have only 2 points on the curve, this will make the highlights a bit cooler (Fig.07a), but by adding a third point you can limit the effect only to the shadows (Fig.07b). You can do the same to the highlights, midtones – anywhere you want. You can do it on separate layers for greater control and order. The color pickers work in a similar way to how they work in Levels. Using Curves, you can also replicate the effects of Color Balance and Brightness/ Contrast adjustments, a Channel Mixer, and if you really try you can draw a curve that'll look similar to Posterize.

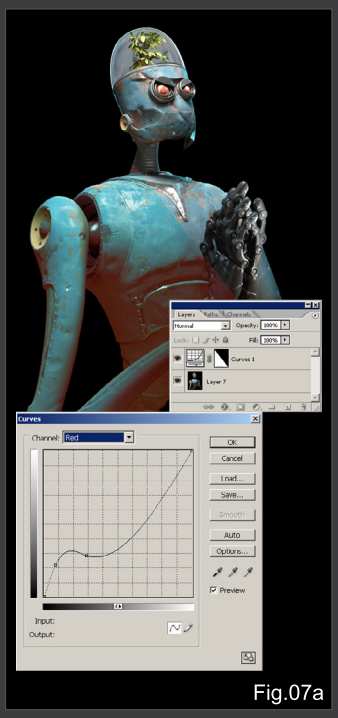


Fig.07a

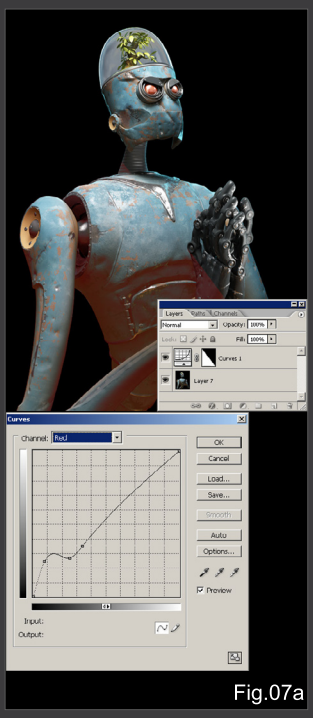


Fig.07a

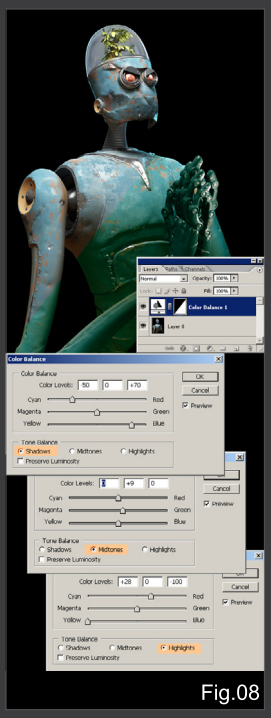


Fig.08

Color Balance allows you to quickly and easily change the color temperature; for example, by adding some blue to the shadows, or red-yellow to the highlights. This is less powerful than the Curves, but quite often it's powerful enough (Fig.08 – separately adjusted Highlights, Midtones and Shadows).

Brightness/Contrast is a very simple tool. If simple adjustment of the brightness or contrast is what you need, it'll do. For anything more advanced, use Levels or Curves.

Hue/Saturation, as the name implies, allows you to adjust the Hue, Saturation and Lightness. By default it works on the whole image (Master). It can also work on any selected part of the spectrum – Yellow, Red, etc. Those are only the presets; you can adjust which part is affected by using the slider at the bottom of the window (**Fig.09**). You can also use the color picker to choose the color that needs to be changed directly from the image. In Colorize mode it makes the image monochromatic.

Selective Color can be used in a similar way to Hue/Saturation, but the effects are more subtle and you don't have as much control. Nevertheless, it's often quite useful for fine-tuning.

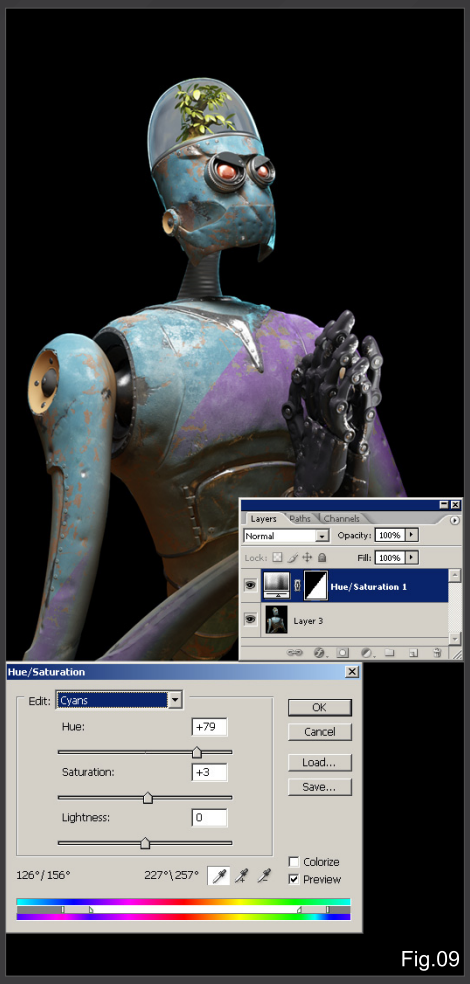


Fig.09

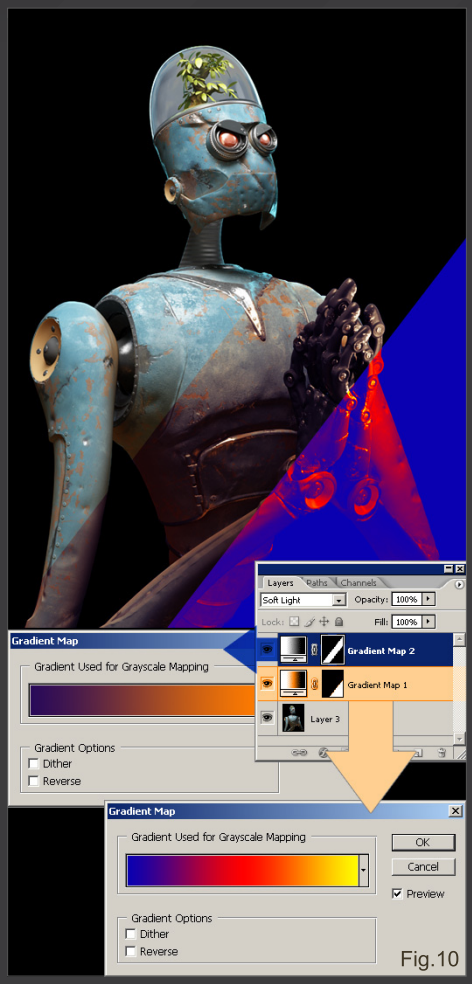


Fig.10

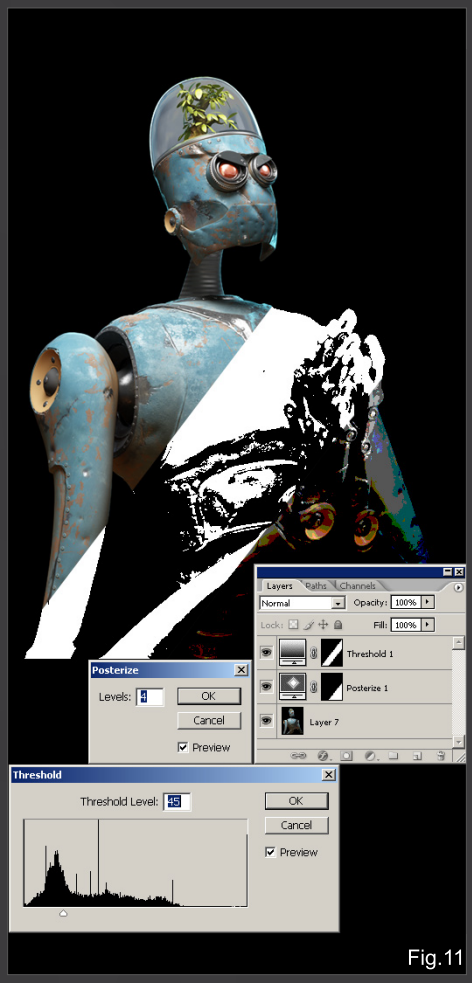


Fig.11

Channel Mixer lets you change the amount of contribution from each of the channels. You can do all of that easily, and more, using Curves. I therefore don't remember using the Channel Mixer in last few years.

Gradient Map is one of my favourites. It lets you achieve a wide variety of effects, from predator-like thermal vision, color correction, to a bleach-bypass kind of effect. The magic lies in choosing the right gradient and the right layer blending mode. Overlay and Soft Light are the most useful ones (**Fig.10**).

Photo Filter mimics the effect of a colored filter applied to the camera lens. If you need to quickly make the whole image cooler or warmer, it'll do.

Posterize and **Threshold** (**Fig.11**) I have found to be almost totally useless. That doesn't mean they are useless to everyone, I just don't need the kind of effect they generate and so don't use them in my work.

Invert is actually more useful as an old-school adjustment. That's because I use it mostly to invert masks and channels for selections.

Ok, so enough of the theory. Let's see how all this works in the real world!

The image I've been using as an example is a raw render. The final post-processed image looks quite different. I've done quite a lot of things to it, and I'll try to cover the most important techniques here. You can also download the PSD file with this tutorial (click on the **Free Resources** logo) so you can dissect it and follow along with this tutorial as you go.

The background started as a layer filled with a light blue color, which I then added some shading to using Gradient Fill, and blurred

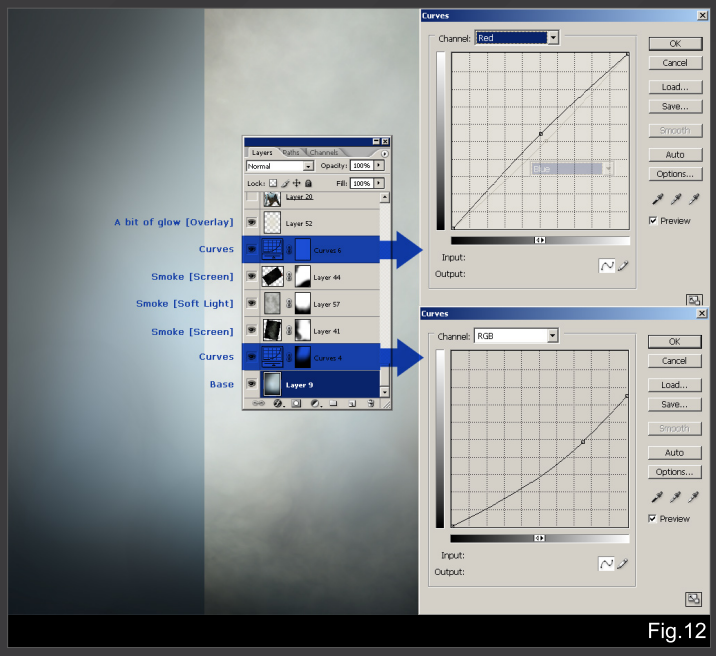


Fig.12

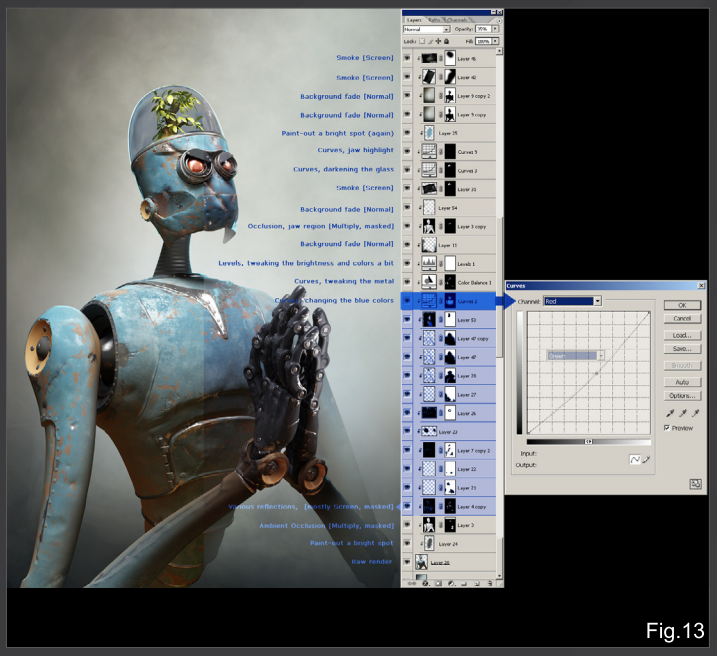


Fig.13

it a few times. I then added a few layers of photographed smoke (using Screen or Soft Light mode), and some Adjustment Layers to adjust the brightness and colors (**Fig.12**).

The main character was rather more heavily edited. Using the rendered RGB masks and separately rendered passes containing HDR reflections, I added some reflections to the exposed metal, glass, eyes, and very subtly to the whole robot.

Using the Ambient Occlusion pass I darkened the details of the hands and the eyes, and made the separation between the jaw and the head more visible.

Using Curves, I changed the coloring of the blue paint a bit, and made a few more subtle adjustments using both Levels and Curves. The fading into the background was created by painting over the character using a Soft Round brush and colors sampled from the background. This was augmented by a duplicated background layer, masked using the ZDepth pass and some subtle smoke screened on top (**Fig.13**).

The leaves were corrected and faded in the same way. Using a motion-blurred copy of the layer I created subtle volume-like shadows of them.

Then came a few gradients to both darken and brighten the image.

The first serious color correction came next: Curves, to warm up the whole image (**Fig.14**).

The glow of the eyes was done with a couple of round brushstrokes in Overlay mode, some photographed, overlayed smoke, and again a couple of strokes in Linear Dodge mode to make them feel alight.

Curves were then used to darken the image a bit, along with some vignetting and some subtle texture overlay.

The final color correction was done using a Gradient Map in Soft Light mode (**Fig.15**).

The last thing I did to the image was to add a tiny bit of chromatic aberration. A word of caution here: It's easy to do a lot of harm to an image this way, simply by overdoing it. I don't really like this technique because it simulates photographic artifacts – I do however like it because it changes the sharp edges, softening

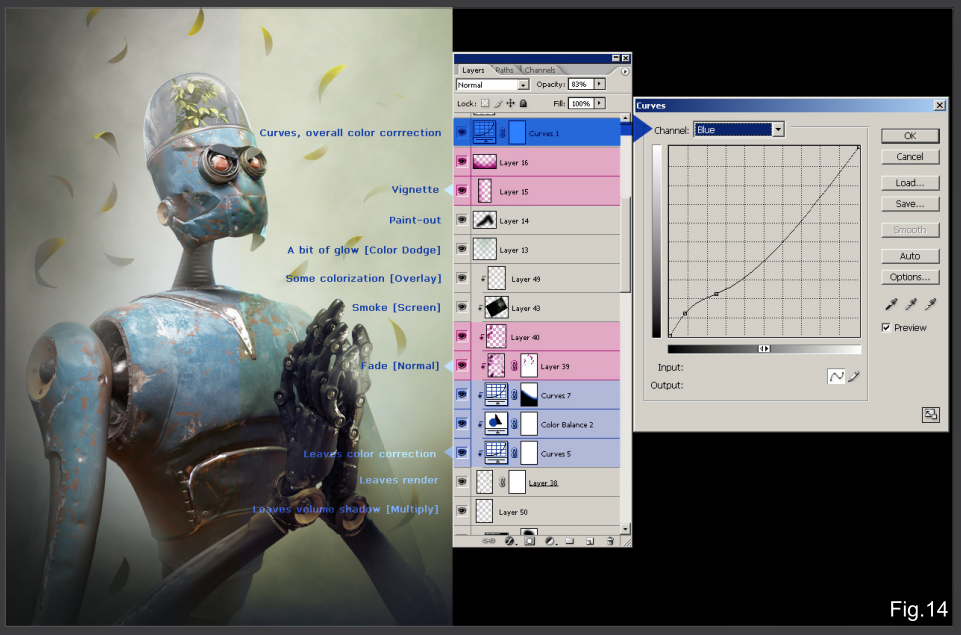


Fig.14

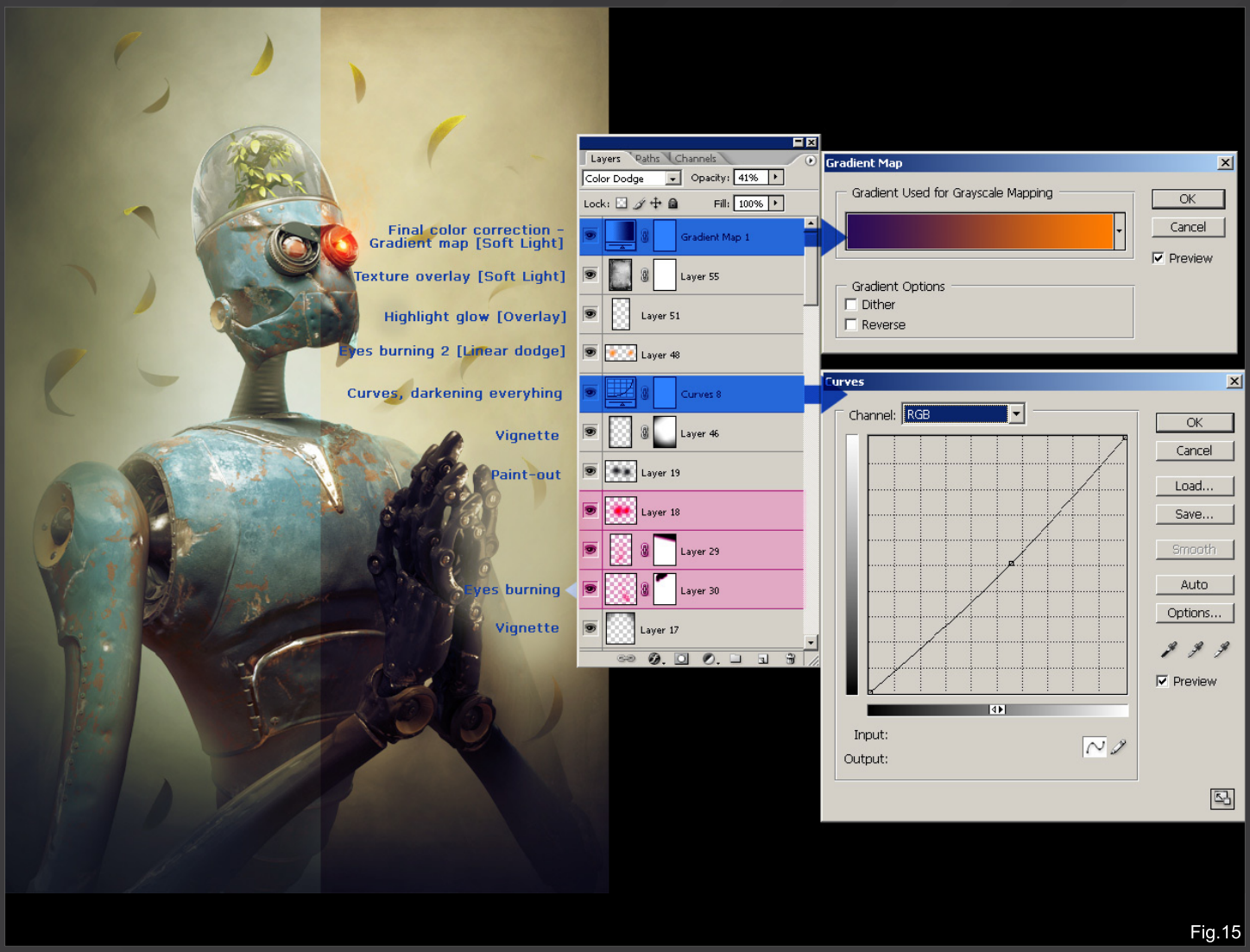


Fig.15

them, but in a slightly different way to just subtle blurring; it softens the harsh bump-mapping nicely, adding some color variation to the bump shading. The easiest way to apply chromatic aberration is by using a tool designed to remove it – Filter > Distort > Lens Correction, by carefully playing with the settings.

As mentioned earlier, you can dissect the PSD on your own; its low-resolution version is included to download with this tutorial, so take a look and see how the various layers work for yourself.

The conclusion…? Use Curves! It's the most powerful and efficient of all the Adjustment Layers that Photoshop has to offer. Don't be afraid to experiment, to change blending modes and the opacity of the Adjustment Layers, or even simply duplicate them. Accidents and errors are easily fixable, even for a long time after they have happened. And sometimes, of course, these accidents can even produce some interesting effects themselves!

Andrzej Sykut

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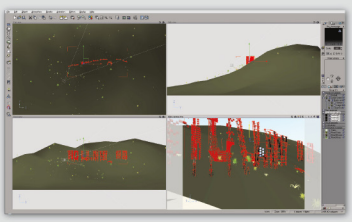
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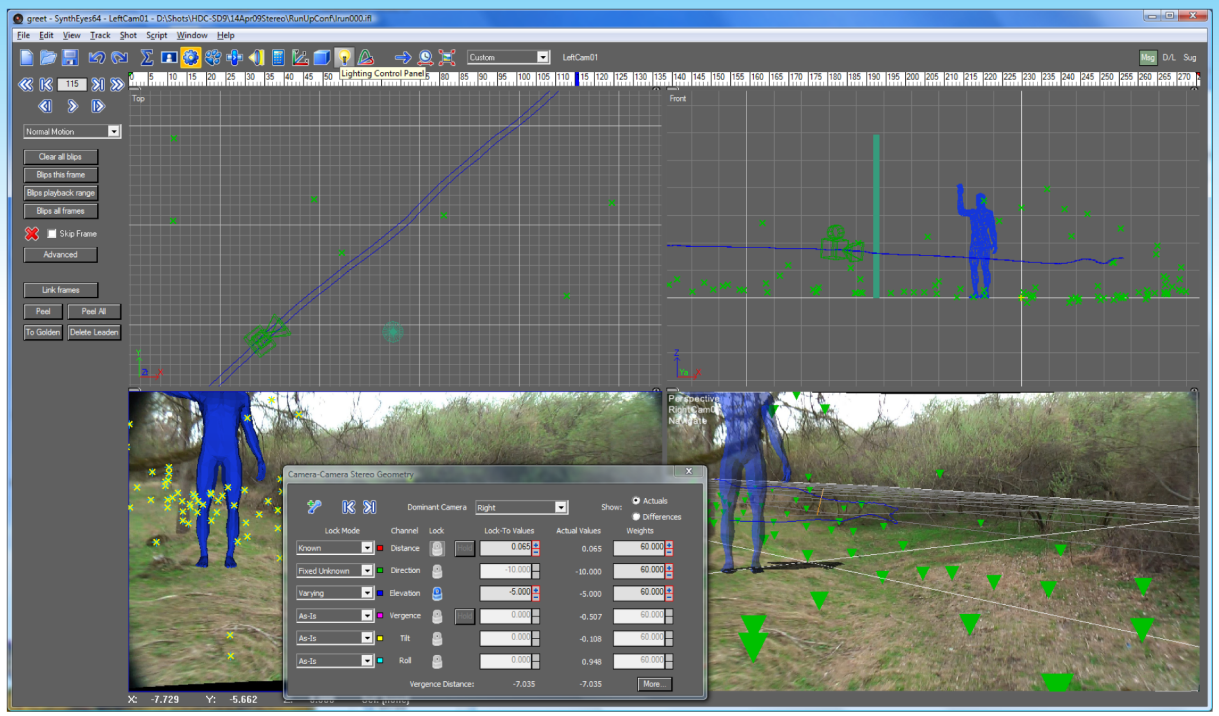
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"From time to time I find it useful to look at anatomy reference images – not completely trying to copy human muscles, just using them as a guide for my modeling work. I then use the Inflat brush to add some volume to the larger muscles of the body."

June 2009
Part 1: Bird-Man

July 2009
Part 2: Mammal-Man

August 2009
Part 3: Aquatic-Man

September 2009
Part 4: Amphibian-Man

October 2009
Part 5: Insect-Man

November 2009
Part 6: Reptilian-Man

zbrush manimal

creation series: part 6 - reptilian-man

Welcome to the new ZBrush Manimal Creation tutorial series. Each month we'll see a new artist tackle one of our topics, who will take us step-by-step through the transformation of a generic human head and torso base mesh into a hideous amalgamation of man/creature of 3DCreative's choice! We thought that topics such as a bird, aquatic, and insect would be fantastic for detailed sculpting work – and on top of all this, the artists will texture their models, too, bringing these monstrosities to life. So stay-tuned over the next six months to see what they come up with, and to learn a thing or two about detailed sculpting and texturing in ZBrush.

Tomasz Kwiecinski is here this month to show us what his mind and hands create in ZBrush when we say to him, "**Reptilian-Man**"! Tomasz takes us through the entire creation process of his character, from sculpting and retopologizing, to posing and PolyPainting, and then compositing his renders in Photoshop. Also accompanying this tutorial is a time-lapse video for free download showing the artist's ZBrush workflow – look out for the Free Resources logo, and enjoy!

DOWNLOAD RESOURCES

- Free MatCap
- Free Movie
- Free Base Mesh

PART 6 – REPTILIAN-MAN

Software Used: ZBrush and Photoshop

INTRODUCTION

In this tutorial I'll try to teach you my workflow while creating a "reptilian-man" from simple base mesh in ZBrush. I'll aim to show you through the whole process – from the basic development of proportions, through retopologizing in ZBrush, to rendering, and finally post-production in Photoshop.

I won't start out with any concept drawings before starting this model in ZBrush – when you download the free movies with this tutorial you'll see that my reptilian concept is created during the sculpting stage. This way of working is not always a good idea – it's always better to know what you want to do before you start, and if you can't draw then you can at least look for some good reference images on the internet to give you an idea.

SCULPTING

I start this new character in the same way as all the other artists of this series have done before me, with a simple human base mesh (which is available for download with this tutorial).

Before I start sculpting, for easier selection I go ahead and divide the mesh, whilst at the lowest subdivision level, into Polygroups. I hide any unnecessary parts of the model (press Ctrl + Shift, and then release Shift) and use Group Visible in the Tool > Polygroups menu.
With the Polygroups created, I can then start to transform the base mesh by masking, using the Move brush, and the Move/Rotate/Scale Transform tools (W/E/R) to change the overall shapes and proportions to something less human-like in shape (**Fig.01**).

To create a mask, you simply press and hold the Ctrl key when painting on the surface of your model. You can also erase unnecessary parts of mask by pressing and holding the Alt key, whilst

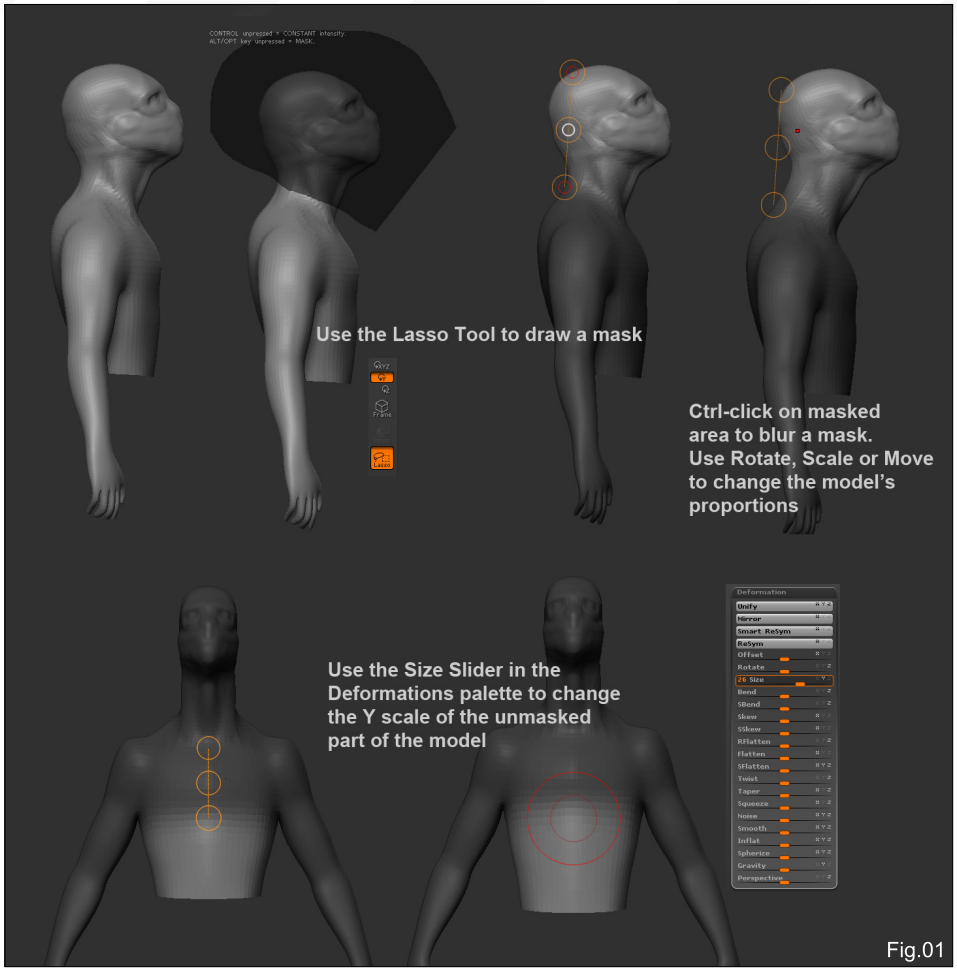
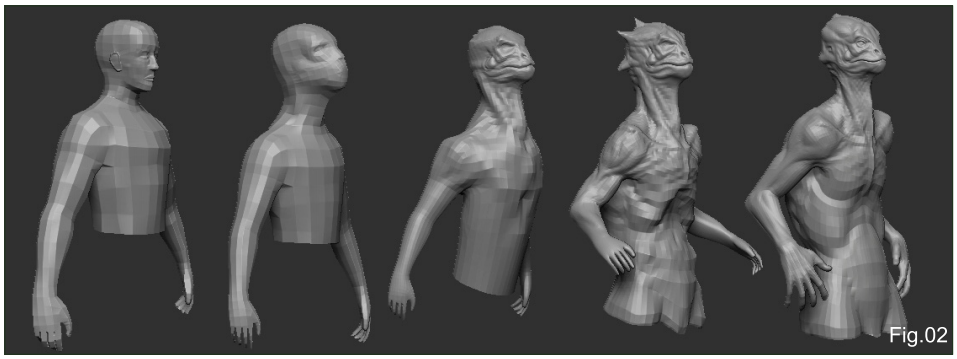


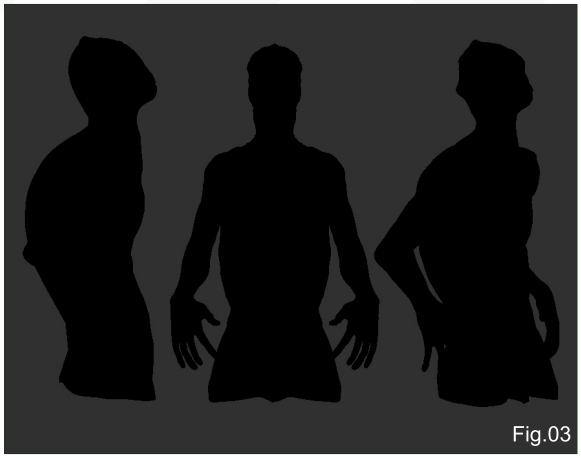
Fig.01


Fig.02

the Ctrl key is still being held. To completely erase a mask drag on the empty canvas holding Ctrl; Ctrl-clicking on the canvas will invert the mask. You can also blur a mask (Ctrl-click on the masked part of your model) and sharpen it (Ctrl + Alt-click). I like to hide my mask during work to make the changes I create more visible (Ctrl + H). There is also a very useful feature called Topological Masking which works with the Move, Rotate or Scale Transform active – simply press and hold the Ctrl key whilst in one of these modes and click-and-drag over your model. You can then create a mask following your mesh topology.

Whilst still at the lowest level of subdivision (or in the second level at most), I begin to block in the basic body shapes, generally using the Standard and Clay Tubes brushes. It's a good idea also to lower the Smooth brush's ZIntensity here; standard settings make the smoothing too destructive when working in low levels of subdivision (**Fig.02**).

When working on the overall shapes of a character design, I try to not concentrate on just one part of model. I jump from head to hands, using masking and the Move tool to change proportions. From time to time I also like to change the material to a flat black color to check how the silhouette is working (**Fig.03**). You can create your own black silhouette viewing material – and save it in material menu – out of any of basic ZBrush basic materials (**Fig.04**).


Fig.03

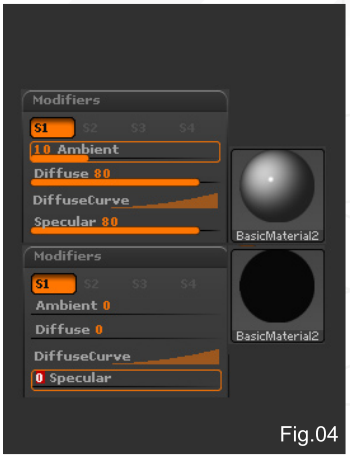


Fig.04

When I have something looking more or less satisfactory, I subdivide once or twice more and then start working on the smaller forms of the body, such as the eye sockets, fingers and muscles. Using mostly the Clay Tubes brush with a strong ZIntensity, I try to create natural looking shapes for the muscles. It's important to always keep in mind at this stage of work the bone structure, too. Muscles don't exist without an underlying bone structure, so it can be really helpful at this point to mark some of the bones and joints in.

From time to time I find it useful to look at anatomy reference images – not completely trying to copy human muscles, just using them as a guide for my modeling work. I then use the Inflat brush to add some volume to the larger muscles of the body.


Fig.05

To create the eye sockets I choose to append an eyeball SubTool. This helps me to make the eyelids correctly and helps me to avoid problems later on when matching them to the eyeballs (**Fig.05**).

To create an eyeball I use the Sphere3D tool from the Tool menu. Draw it on the canvas and use the Make PolyMesh3D button in the Tool palette to enable sculpting. Next, switch to your main tool, use the Append button in the SubTool palette and choose your Polymesh sphere. Switch to your eyeball SubTool in the SubTool palette and use Move (W), Scale (E) and Rotate (R) to place the eye in the right position. With the eye SubTool selected, use the Clone button in the Tool menu to create a copy of the eyeball. Append the copied eyeball in SubTool palette.


Fig.06

Next, skip to the Deformations palette and use the Mirror button to mirror your cloned eyeball tool to right side of the model.

Whilst working on my reptilian head I'm using some iguana reference photos that I've found on Google Images. I'm not trying to make a perfect copy of a reptilian head, I just like to use photos to follow and use them as a guide for the overall shapes. I've chosen to make the back of his head much bigger than what you'd expect of a reptile, as he should in theory have a bigger brain. I've also decided to make his mouth shorter.

With the overall forms defined, I'm now going to start to add the smaller details. Using the Standard brush with Gravity set to around 30 in the brush options, I sculpt in some skin folds, and then use the Standard brush with Brush Mod at 15-20 and a small alpha to sharpen some of the edges, like the eyelids, nostrils and smaller skin creases (**Fig.06**).

Retopologizing

After playing with details and sharpening up edges, I've decided to retopologize my model. It isn't absolutely necessary, but I've noticed some geometry stretching in the lower parts of the body which could lead to problems in later stages of sculpting – especially as I'll be working with scales.

To start the retopologizing process, I create a ZSphere on my canvas. I go to the Tool >

Rigging menu and use the Select Mesh button to choose my model (**Fig.07**). With the mesh selected I then go to Tool > Topology and choose Edit Topology.

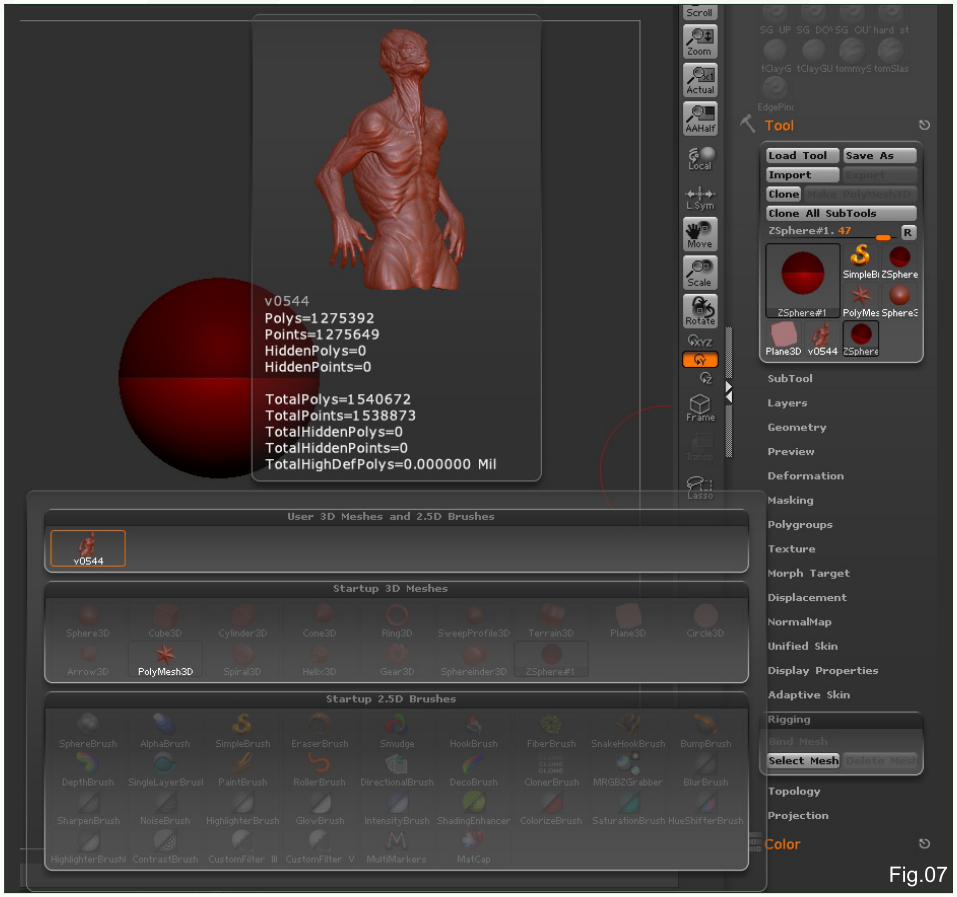


Fig.07

Before I start to create new topology, I like to turn off the viewport shadows in the Render > Preview Shadows menu – this just makes the visibility of the model better, especially in areas like the bottom of the chin or armpits. I then click on the canvas outside of the model to avoid attaching the first topology point to a point already existing inside the model.

Creating new topology in ZBrush is rather easy, much like building a cage of quads on a model's surface. In this part of the work I switch from graphics tablet to mouse to have better control and avoid any random clicks. Keeping the brush size small, I start creating new topology simply by clicking on the model. When you create a new topology point, it's selected (a red circle around the point), and the next click on the model's surface will create the point connected to it. If you want to create a new point without connecting it to the last one, click on the canvas to deselect your last point. To select a new point without creating a new edge, press Ctrl and click on it. You can also delete unnecessary points (Alt-click) or move them (W and Q – back to paint mode). You can also use Ctrl-Shift to hide parts of model if necessary, just like when in sculpting mode.

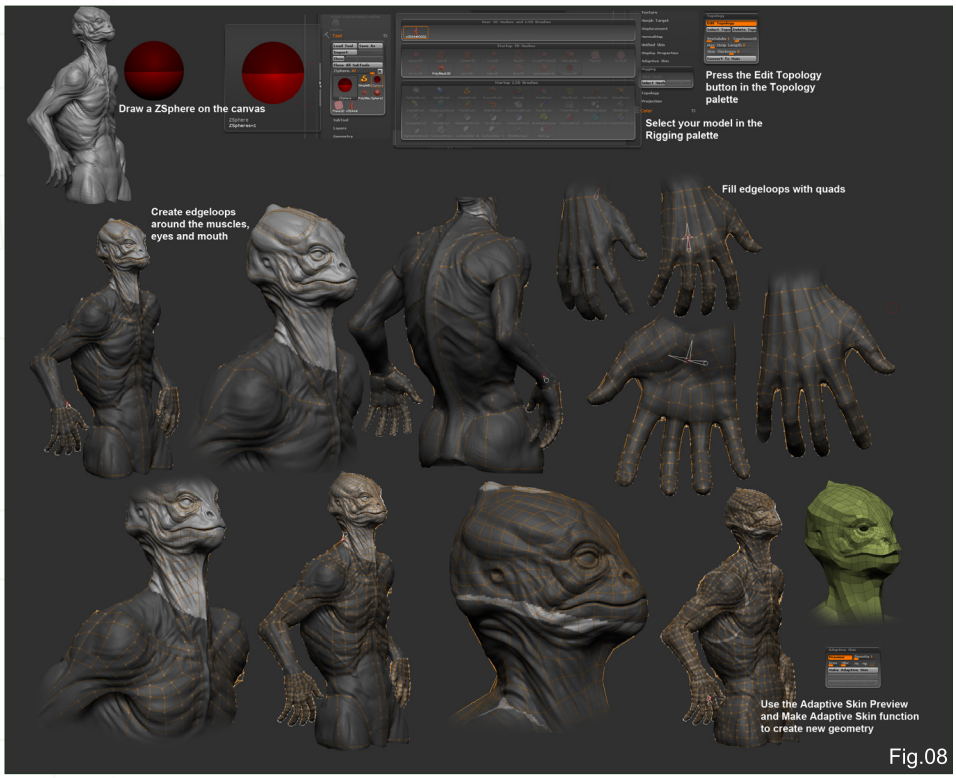
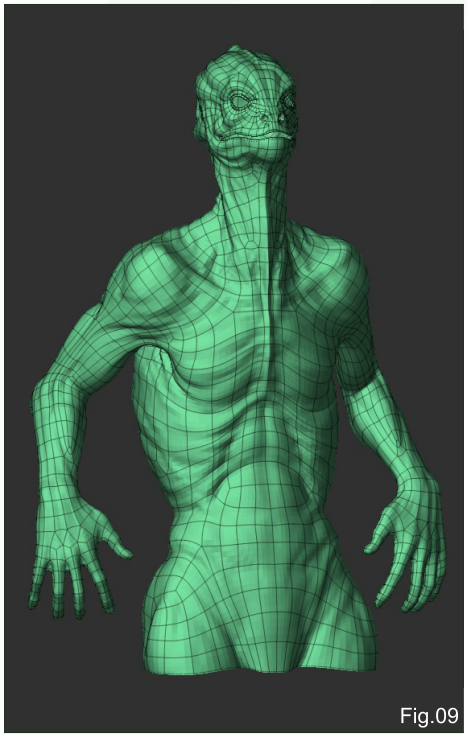


Fig.08

When creating new topology in ZBrush I try to use the same rules as when sculpting or painting. First I create big shapes (edge loops around the muscles, eyes or mouth), and take care of the details later (filling big edge loops with smaller quads). I prefer to turn off the symmetry when creating geometric points in the center of the model, just to avoid errors with doubled centered points. It's important to keep all topology in quads if possible (ZBrush doesn't like triangles!). Create denser topology in places which need more detail, like the mouth, eyes or ears. Use fewer, larger quads in less important places (**Fig.08**).

When the new topology is ready, I use the Preview button in the Adaptive Skin menu to make it visible. I set the Density slider to 1, turn on Polyframe view (Shift + F) and carefully check for errors in the mesh (look out for any unnecessary holes or doubled edges).


Fig.09

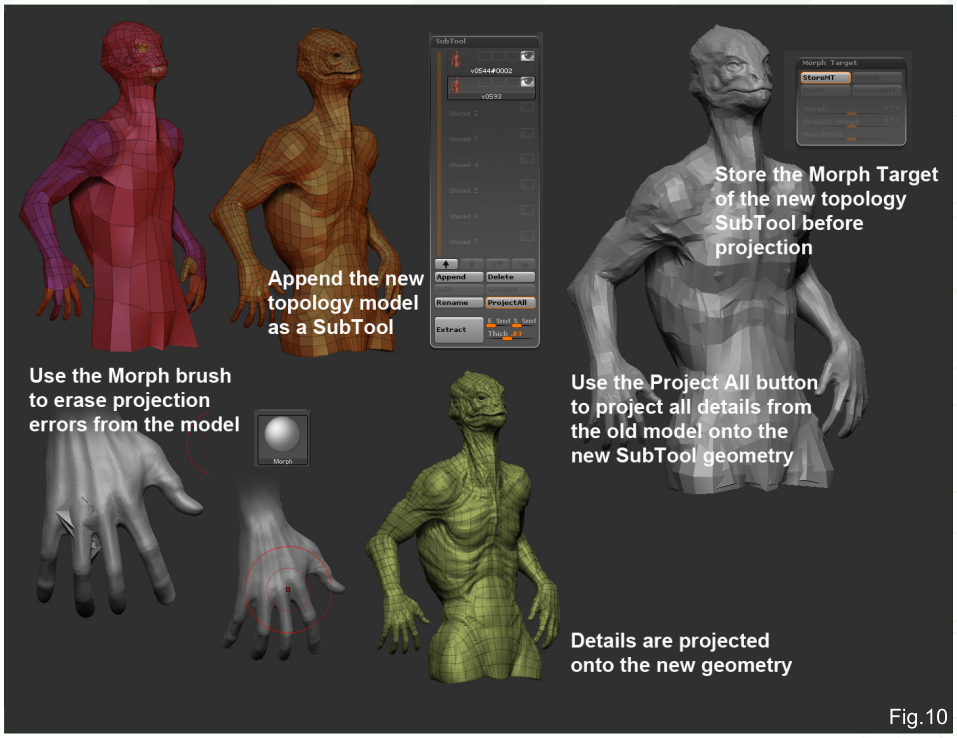


Fig.10

If everything looks fine I then use the Make Adaptive Skin button to create my 3D tool from the topology (**Fig.09**).

Reprojecting Details onto New Topology

First I select my original model from the Tool menu. I draw it onto the canvas and hit T to get into Edit mode. Next I use the Append button in the SubTool menu to append my new topology object as a new SubTool. I set my old model to the third or fourth subdivision level and switch to the new topology SubTool.

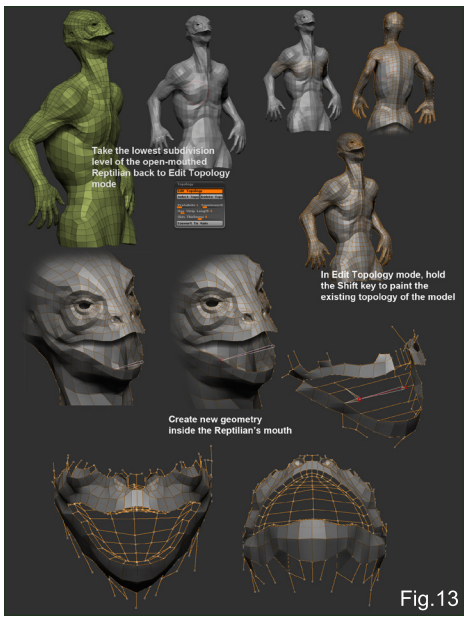


Fig.13

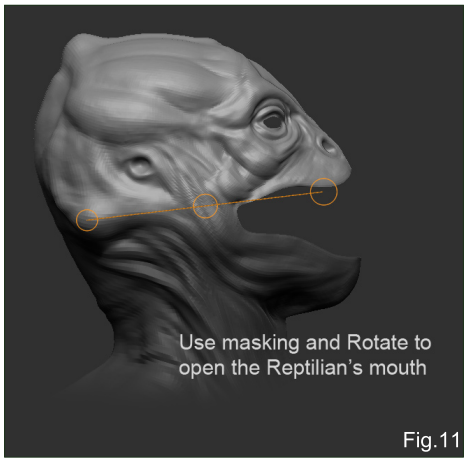
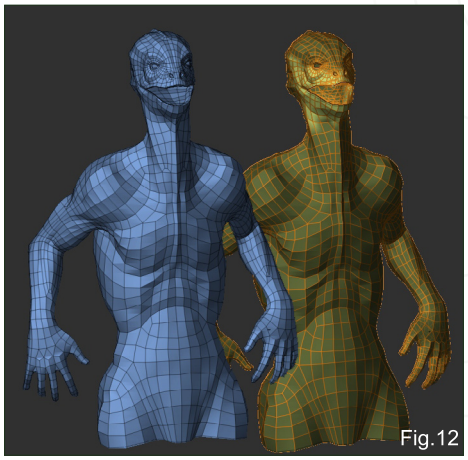


Fig.11


Fig.12

For safety, I create a new Morph Target (StoreMT in the Morph Target menu). With the Morph Target stored I can use the Morph brush to remove any projection errors, like exploding vertices. I then hit the Project All button in the SubTool menu. If everything looks good I can switch to the first SubTool, go to a higher subdivision level, then go back to the new topology tool, subdivide it and use Project All again (**Fig.10**).

Do the same for every subdivision level. In the case of problems use the Morph brush to erase projection errors. Of course, you can use projection immediately on the highest subdivision level rather than skipping between tools and using this step-by-step technique, but I prefer this method – it takes more time but helps to avoid errors.

With the details projected onto my new model I use a mask and rotate (R) to open my reptilian-man's mouth (**Fig.11**).

I can now go back to Edit Topology, this time using the lowest subdivision level. Using the same method as before I go into Edit Topology mode and, holding Shift, I simply paint the existing topology onto my model. All I have to do is to patch the hole inside his mouth with new geometry (**Fig.12 – 13**).

I repeat the same steps as before to project the details onto the model with the patched mouth.

Finishing Details and Adding SubTools

With my new retopologized mesh I can now work some more details over it, sharpening some edges with the Pinch brush, and using the Standard brush with Gravity and the Inflat brush to give a more natural look to the skin folds and muscles. For some of the smaller wrinkles I use the Standard brush with a blurred Alpha 59 (**Fig.14**).

To make teeth for my model, give him spikes on his back and tongue, as well as some claws, I append a ZSphere SubTool. I model some simple ZSphere teeth (**Fig.15**) and use Adaptive Skin > Make Adaptive Skin to turn it into geometry. I then use Tool > Clone, along with Mirror in the Deformation menu, to make the upper teeth.

I model just one ZSphere spike and use copies of it for all the other spikes, and with a few small changes I can use it for the claws as well (use Clone just once and then append as many copies as needed in the SubTool menu). I use Transpose, Move, Scale and Rotate to place the spikes and claws into the right positions. And finally, I use the SubTool Master plugin (http://www.pixologic.com/zbrush/downloadcenter/zplugins/) to merge all claws and spikes into one SubTool – this makes the navigation between SubTools much easier (**Fig.16**).

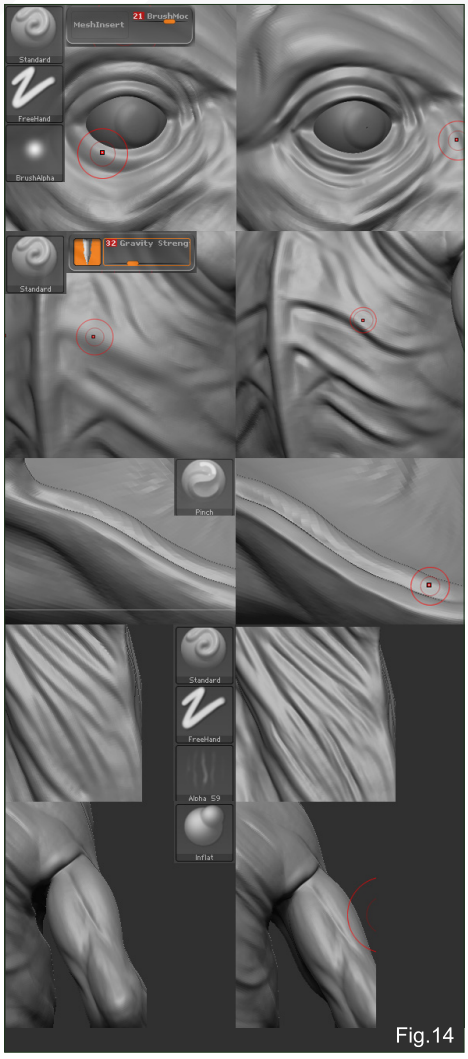
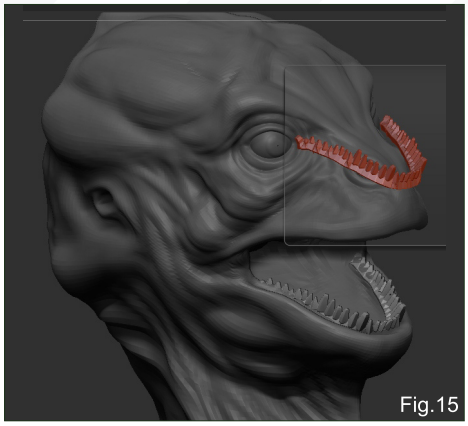


Fig.14


Fig.15

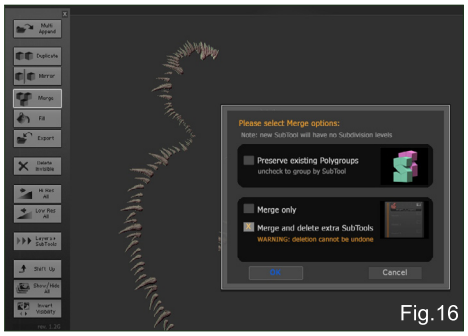


Fig.16

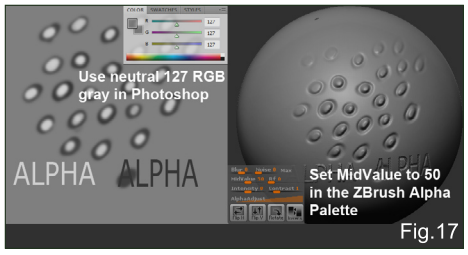


Fig.17

With all the spikes and claws in place I've decided I'm going to make some scales now, rather than just have a flat skin – I want to make my reptilian-man look less human and more interesting! For small scales I'm using the Standard brush with low ZIntensity, DragRect stroke, and a couple of reptile skin alphas which I've found on the internet. You can find lots of free alphas at the Pixologic Download Center (http://www.pixologic.com/zbrush/downloadcenter/alpha/). You can also create your own alphas in Photoshop from photos – simply convert a photo to 8- or 16-bit grayscale. I actually prefer to paint my alphas by hand though, as it gives me more control than using a photo (**Fig.17**).

To avoid ugly intersections between individual brushstrokes I make use of Radial Fade in the Alpha menu, which makes the outer edges of the alpha more transparent. I always try to follow the natural flow of muscles and skin, placing my brushstrokes carefully and trying to rotate the alpha in the right direction (move your graphics tablet or mouse holding the left button to rotate or scale the alpha with the DragRect stroke) (**Fig.18**).

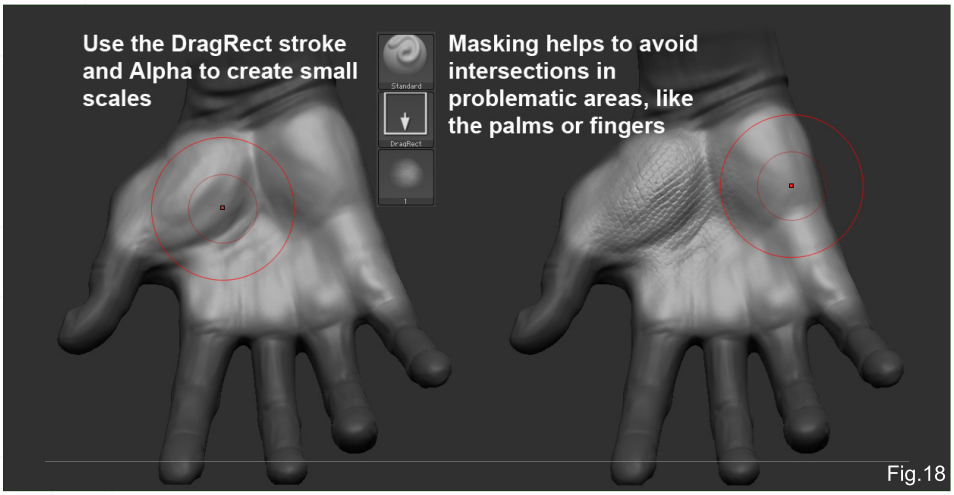


Fig.18

The large scales on his head and fingers I have made by hand. I start by painting the shape of the scales using a mask (holding Ctrl). I then invert the mask (Ctrl + I) and hide it for better visibility (Ctrl + H). When sculpting scales, I use the same technique as before, mostly using the Clay Tubes brush along with the Standard and Pinch brushes, and finally the Inflat brush comes in handy to give volume. A couple of strokes of a low intensity Flatten brush helps make the scales look more angular (**Fig.19**).

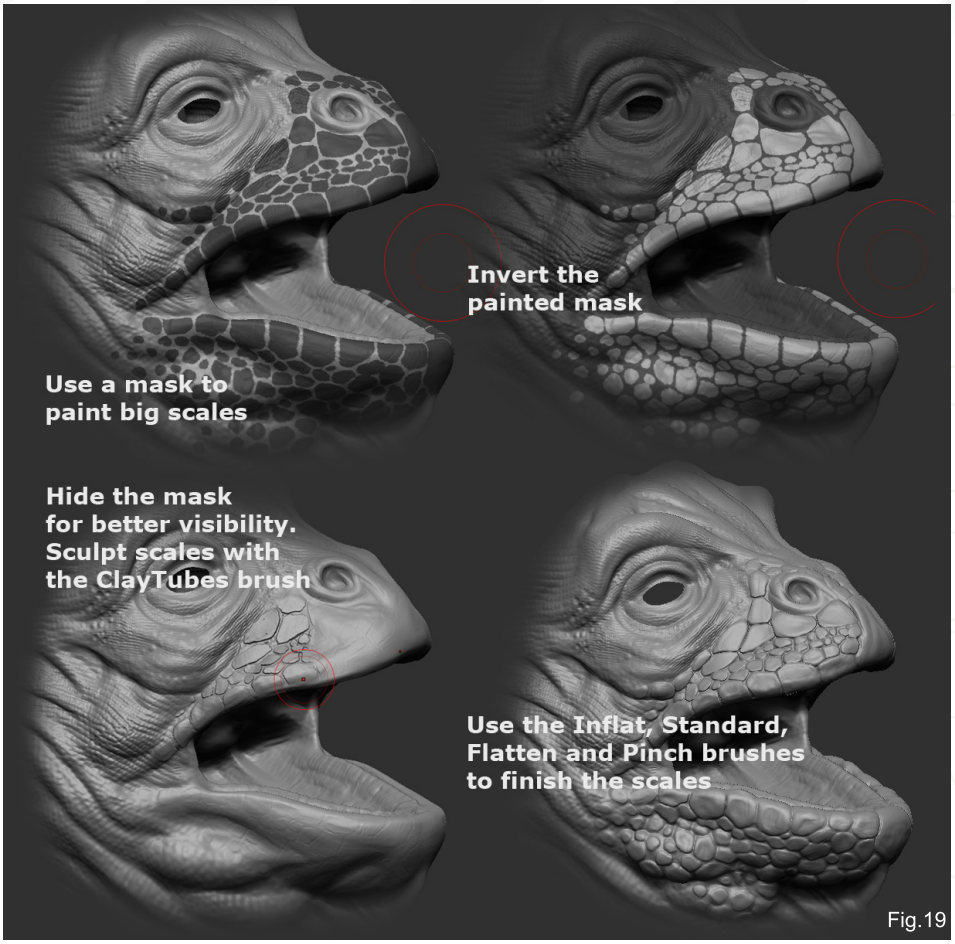


Fig.19

POSE

To pose my character I use the Transpose Master plugin (http://www.pixologic.com/zbrush/downloadcenter/zplugins/) (**Fig.20**). It's simple to use: just click the TPoseMesh button in the plugin menu and it creates a low version of the model with all SubTools merged together.

I use the usual masking and rotate technique to make some pose changes here, and when ready I press the TPose > SubTool button in the Transpose Master menu to transfer changes

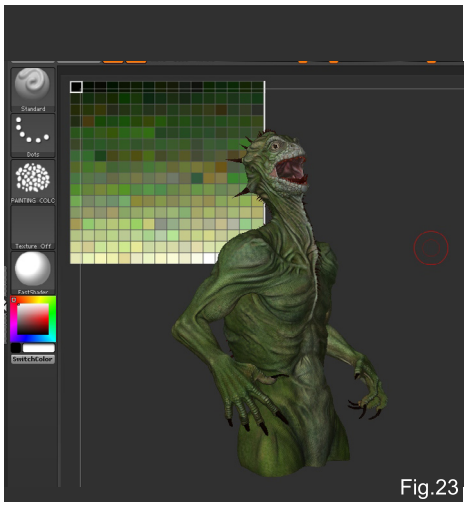

Fig.20



Fig.21



Fig.22


Fig.23

to the original model, including all SubTools. Finally, I use a couple of strokes of the Inflat and Standard brushes to make the posed muscles look much more natural (**Fig.21**).

POLYPAINTING

Before I start painting, I change the material to MatCap White. I also use a modified FastShader (**Fig.22**) and Flat Color materials to check the look of my texture from time to time.

I don't like ZBrush's color selection too much, so I prepare a couple of color palettes from reptile photos in my paint program and load them onto a ZBrush canvas using the Image Plane plugin (http://www.pixologic.com/zbrush/downloadcenter/zplugins/) (**Fig.23**). I can now select colors from my palette just by clicking on the ZBrush color selector and dragging it to the right color in my palette on the canvas. You could do the same thing with a photo rather than a palette, to sample real colors from it.

I'm now going to turn off ZAdd on my Standard brush, turn RGB on, and fill the model with a base color (Color > Fill Object). I add some color

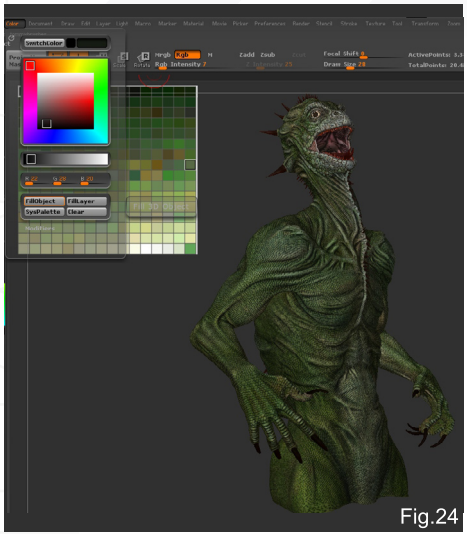

Fig.24


Fig.25



Fig.26

variation with the Color Spray stroke with a low RGB intensity, with a couple of different alphas. I continue painting with a very low RGB intensity (around 3-6) with different color variations, trying to make recessed parts of the model darker, and adding small details with skin alphas and the DragRect stroke. Finally, I use cavity masking to select cracks between the scales and I fill them with a dark, almost black color (still using a low RGB intensity), just to make them more visible (**Fig.24 – 25**).

Rendering

For the final render I use Grant Warwick's GW_SkinCore material as the base shader (free to download with this tutorial – simply click on the Free Resources icon). Three versions of basic materials are setup to show only specular highlights with different specular curve settings (**Fig.26**); white MatCap is used as an ambient occlusion pass for compositing; and I make a Flat Color render just to be safe (in case I need to make some color corrections later).

I also use Alpha > Grab Doc to create a ZDepth pass, plus a flat color render with the various SubTools filled with different colors to use as a mask in Photoshop (**Fig.27**).

I make some changes now to the standard light settings (**Fig.28**) where I set Super Sample to 2 in the Render > Antialiasing menu. I then make the final renders in double the resolution of the final image, simply for better antialiasing.


Fig.27

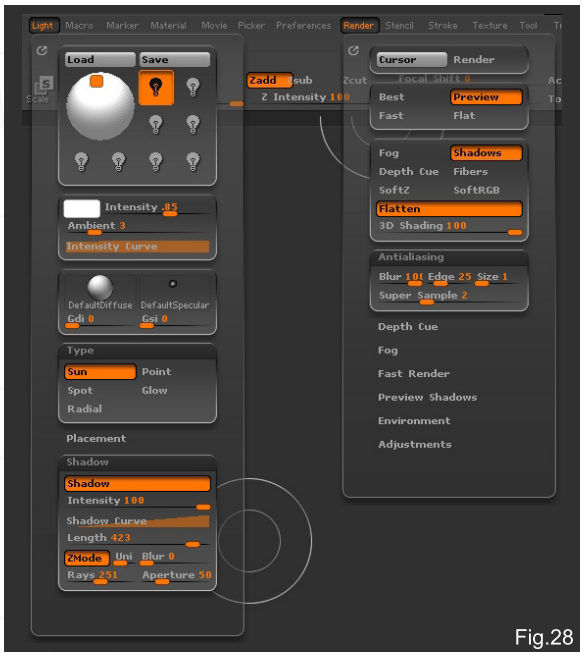


Fig.28


Fig.29

Compositing

And now it's time for a little post-production in Photoshop. The final refinement in your 2D application of choice is one of most important parts of creating a good image. My basic render from ZBrush doesn't look too encouraging (**Fig. 29**), but then even the best Mental Ray renders sometimes need some help from Photoshop! So first of all I create a new Photoshop

document with all my ZBrush render passes in it (**Fig.30**). I use my Flat Color render as a clipping mask for all the other layers, so I apply it over the background and use the Create Clipping Mask function (Alt + Ctrl + G) for all layers over it.

Now, with the clipping mask active for higher layers, I can work on my background. I use a low opacity brush to make a smoky looking effect, a couple of low intensity color gradients, along with a little use of the Blur and Smudge tools, and it's ready!

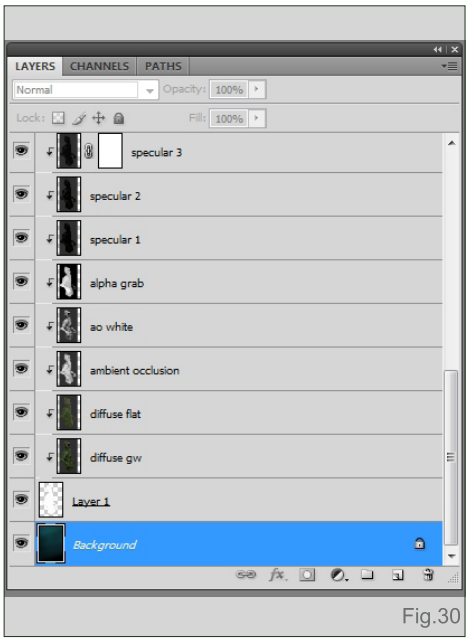


Fig.30

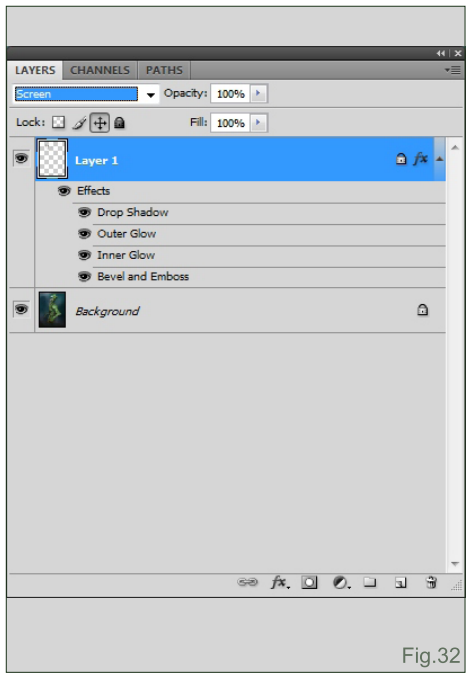


Fig.32



Fig.31

I can now take care of the reptilian figure. I use some different layer compositing options and opacity values for my render passes: Color Burn for my flat color pass, Overlay for my ambient occlusion one, and Screen and Lighten for different specular passes. I also use a Layer Mask for some of the passes and make some hand corrections to them. This part of the work is mostly about experimentation with different blending modes and opacity levels. I find that using a couple of adjustment layers like Levels, Hue/Saturation and Brightness/Contrast are also particularly effective to help you get your desired results (**Fig.31**).

To finish the post-production work, I've decided to add a little drool effect to his mouth. I was a bit too lazy to paint all the tiny highlights in his saliva by hand, so I simply use a new layer with couple of blending options like Drop Shadow, Outer/Inner Glow, and Bevel and Emboss (**Fig.32**). With these blending effects set I can

paint drops of saliva with a simple black color, and the layer effects do the rest of work for me (**Fig.33**)! I use the Screen blending mode for this layer, and after flattening the image I use the Dodge Tool to emphasize the highlights in the drool.


Fig.33

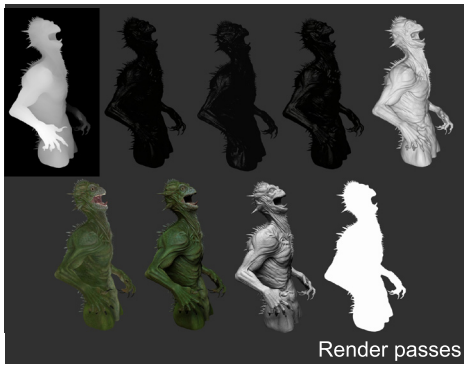
And here is the final composition (**Fig.34**).

CONCLUSION

I'm pretty happy with how my final image has turned out. It may not be photo realistic, but I like the results and what I've achieved. This was my first work completely rendered in ZBrush (I normally use Mental Ray to render) so I think it has come out pretty well for a debut! I also had lots of fun working on it, so I hope you've enjoyed this tutorial and that it helps you to come up with something in ZBrush that you're also proud of. Thanks for reading!


Fig.34


Finished model


Render passes

TOMASZ KWIECINSKI

For more from this artist contact them at:
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"The building itself will dictate the style of architecture used throughout and will essentially be reorganized into a different structure altogether."

Creating a Fantasy Scene

Using 3D, Photography and Post Production

Using 3ds Max and Photoshop, we'll be teaching you how to create a fantasy scene inspired by real-world architecture, and how to correctly and effectively use reference photos of your chosen source of inspiration to get stunning effects quickly and easily! This month we're tackling the photography and concept stage in preparation for the 3ds Max work coming in the next issue. Read on to join Richard Tilbury for the first chapter of the 5-part series.

Chapter 1

This chapter will focus on the concept phase and how an idea can be derived from a series of reference photos taken in a specific location.

Chapter 2 | December 2009 Issue 52

Chapter 3 | January 2010 Issue 53

Chapter 4 | February 2010 Issue 54

Chapter 5 | March 2010 Issue 55

CREATING A FANTASY SCENE USING 3D, PHOTOGRAPHY AND POST PRODUCTION: PART 1

Software Used: 3ds Max and Photoshop

INTRODUCTION

During the course of this tutorial we will build a fictional scene inspired by an existing location – in this case a cathedral. The building itself will dictate the style of architecture used throughout and will essentially be reorganized into a different structure altogether.

All of the architectural forms and details will be extracted from the cathedral itself, and after being deconstructed shall be reassembled to assume a new design – rather like building with Lego, if you like.

The building will then be placed into an imaginary environment and will start its life cycle as a 3D model built inside 3d Studio Max. Our 3D package will be used to create the lighting and perspective, as well as setting the camera position/viewing angle.

Photographs taken of the site will then be used to create rudimentary textures used to map the building. 3DTotal's Free Texture & Reference Image Library (http://freetextures.3dtotal.com/) will be used to construct the scenery in a way akin to matte painting, as well as add finer details to the building model.

The final stage of the tutorial process will involve revisiting the location in order to photograph

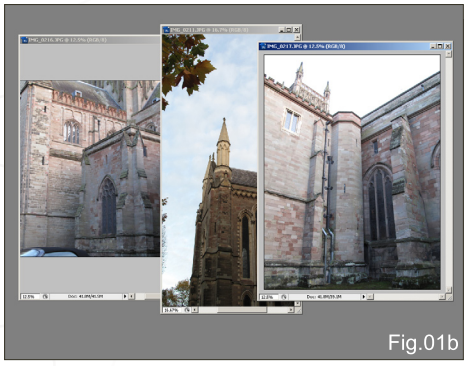


Fig.01b

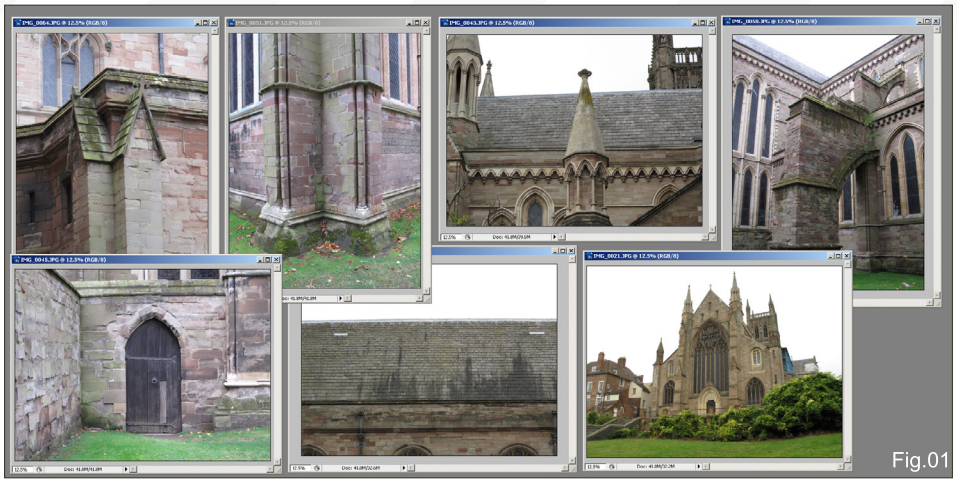


Fig.01

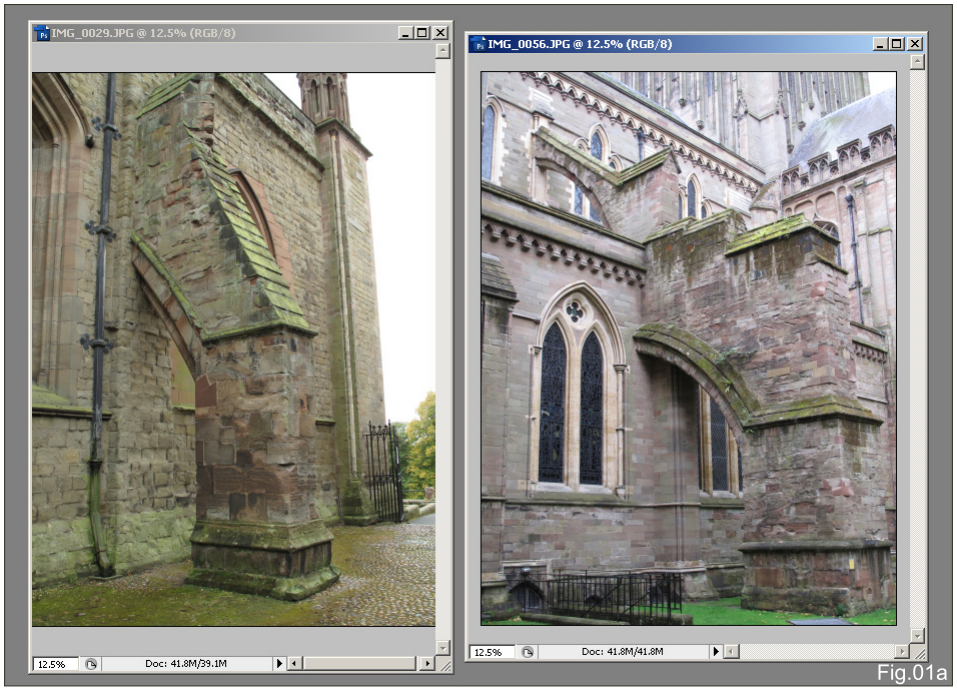


Fig.01a

certain parts of the cathedral from specific angles to match the perspective in our scene.

PHOTOGRAPHY

The first stage of the exercise involves taking a camera to the actual location and photographing as many aspects of the building as possible. From these we can begin to design our building along with its environment and get an idea about the concept.

In **Fig.01** you can see a handful of photos that were taken of various features of a cathedral. It is good practice to take as many as you can at this stage because even the most incidental details can become significant during the concept phase, and you can always choose to reject those that are inadequate. The idea at this stage is to simply catalogue as much information as possible in order that you can sift through the library back in the studio and therefore increase your options.

A good rule of thumb is to try and take photos on an overcast day where there are no strong shadows, but rather a general ambient light. Good examples are the two photos seen in **Fig.01a** where there is a soft light above the scene and no stark shadows.

It's a good idea to start with a blank canvas, as it were, without the need to first correct any strong lighting effects, as they will rarely match your scene. Sometimes a directional light can

prove useful, but overall aim for a Soft Light. An example of some pictures which may prove difficult to work with can be seen in **Fig.01b**.

Once you've had a chance to look though everything and digest the reference images you can begin work on your concept. I decided that, because of the stonework in the building and its sense of mass and weight, a scene set in the mountains might prove sympathetic. Also, there are some dramatic photos in 3DTotal's Free Texture & Reference Image Library (http://freetextures.3dtotal.com/).

To create a sense of scale and depth I've opted to have something in the extreme foreground in the form of a small doorway that could perhaps be a secret entrance to the bridge?

CONCEPT

I often like to start an image with some abstract marks and shapes to help suggest forms and an initial direction. In this case I began by adding in the foreground a doorway set into a rock face, and then roughed in a background (**Fig.02**).

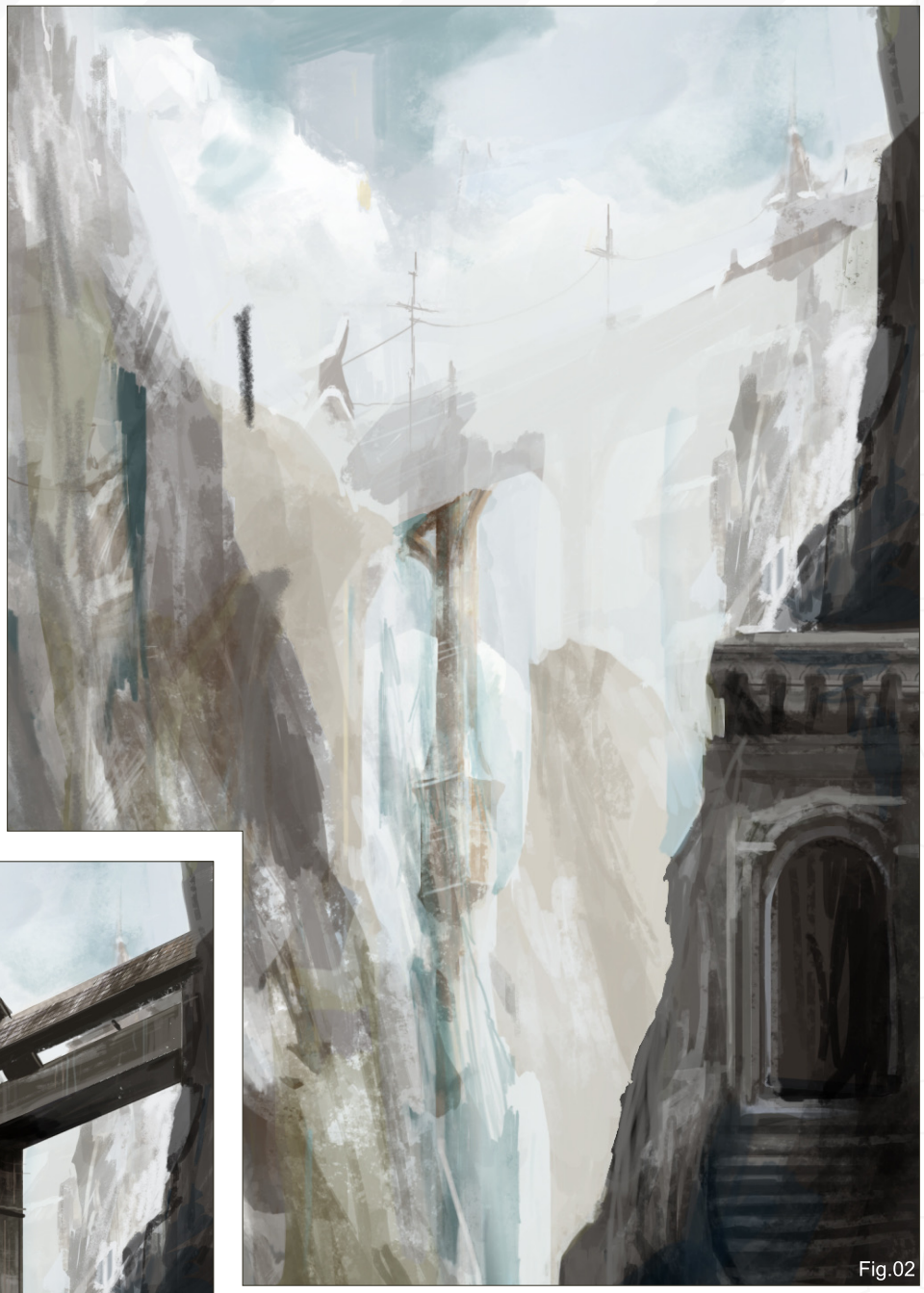


Fig.02

I imagined the large mass on the left as the side of a mountain, but some of the marks in the center of the image suggest the underside of a bridge spanning the chasm from right to left. The notion of a building set into the side of the left mountain and connecting the opposite side of the canvas via a bridge felt as though it would make an interesting composition. So with the decision made, I began building the architecture from the library of photographs taken on location (**Fig.03**).

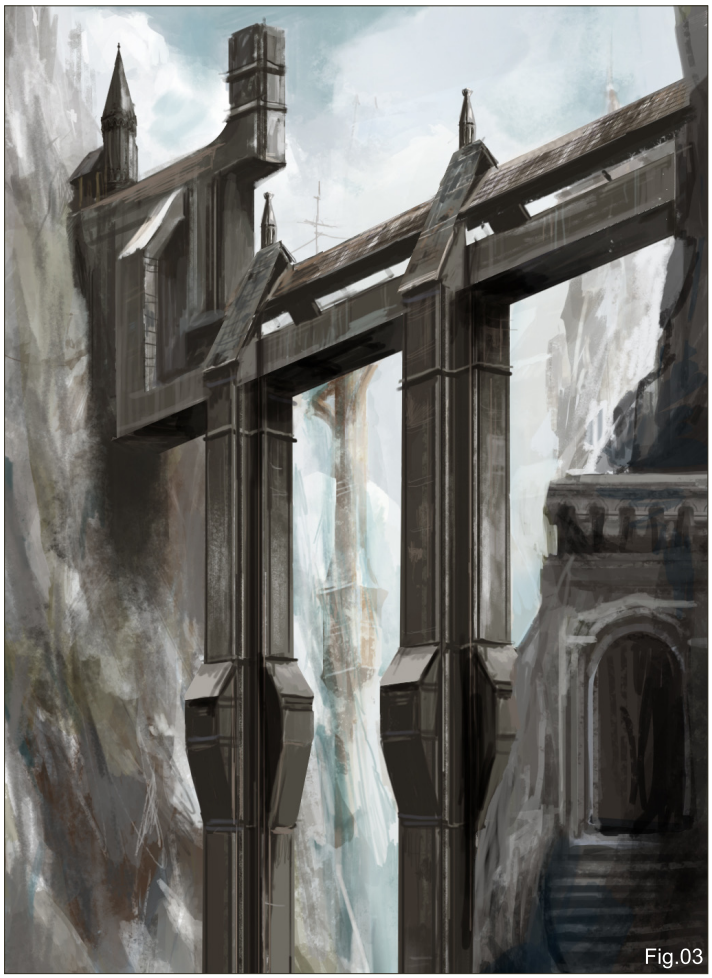


Fig.03

I blocked in the main forms, focusing on the perspective and overall shapes apparent in the structure. Whilst standing beside the cathedral

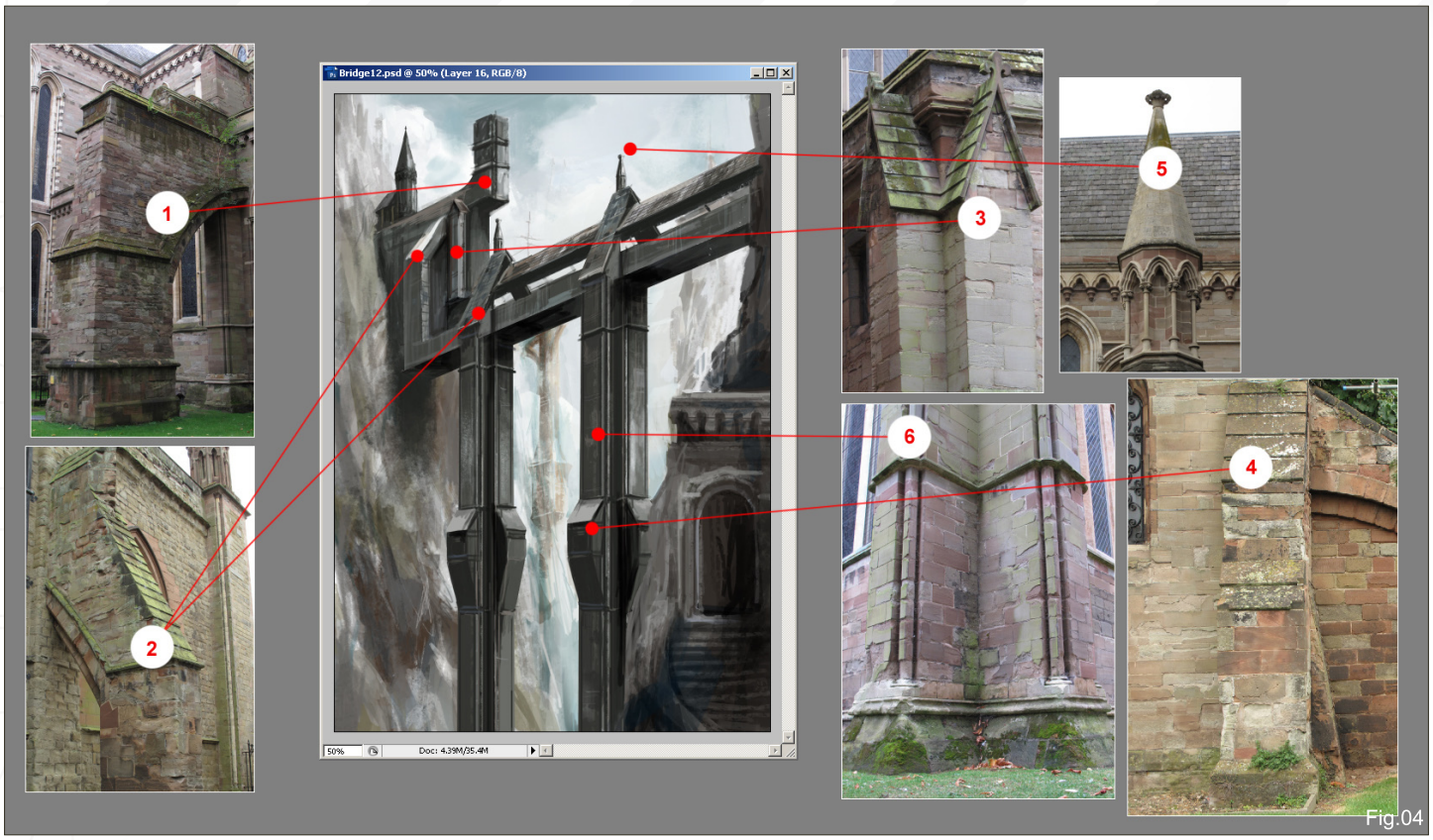


Fig.04

you get a feeling of how the heavy stone work appears to emerge from the ground and vault towards the heavens, and so I wanted to echo this sense of verticality in my concept. I therefore used two huge columns as my key structural devices to help create the height.

In **Fig.04** you can see how the architecture in the concept has been derived from certain features on the cathedral. The columns have been directly copied from those in photo 6 but will be mirrored eventually so that from the top they look like a cross.

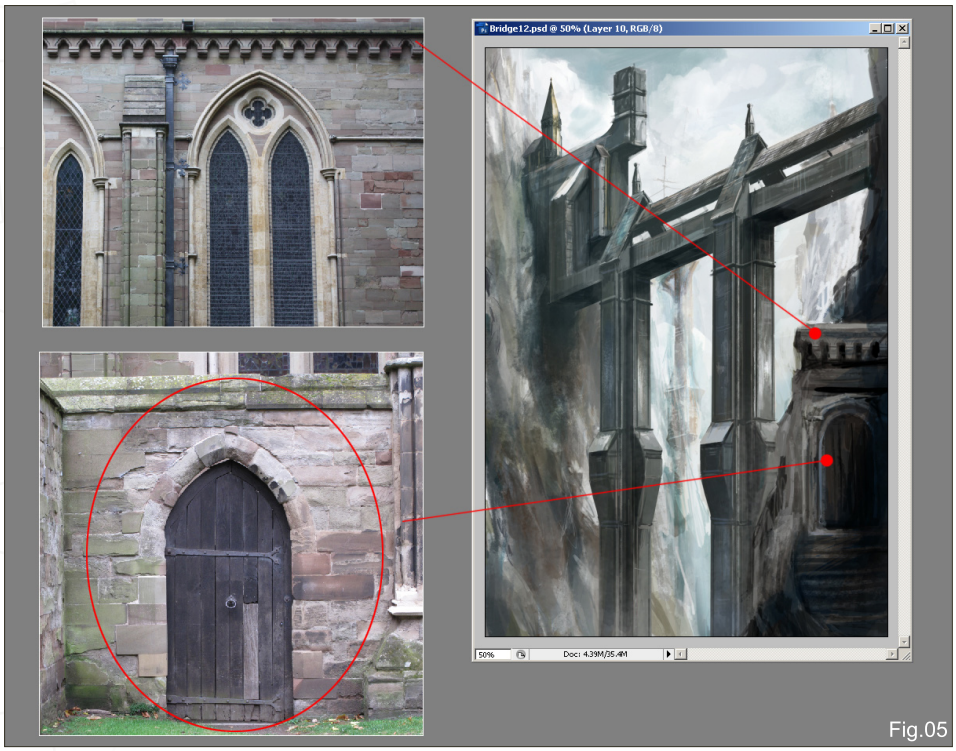


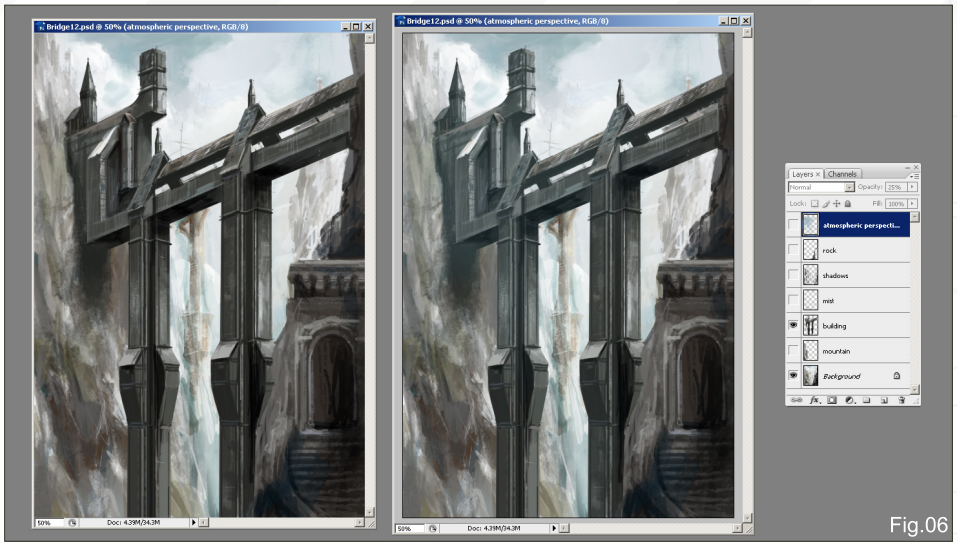
Fig.05

To add some interest I added in section 4 which will use this tiled roof and be flipped 180 degrees to then form the lower half. The main upright on the left side incorporates the arch in photo 1 which has also been flipped upside down and back to front with the arch now on the upper side. The column in photo 2 has been added onto the near side and the tiled roof mimicked above the two main bridge supports.

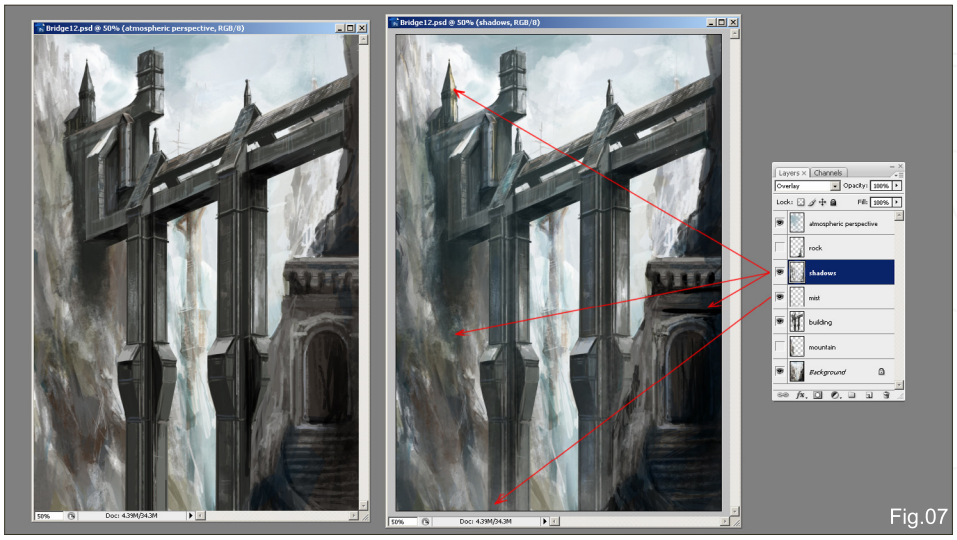
You can see how each of the main components have been extracted from the photographs and rearranged to create a different building, the point being that the world around you is a great source of inspiration and stimulus for the imagination.

In terms of the foreground I've decided to use the door seen in **Fig.05** which suits the theme. I could include the stonework around it and even incorporate the top of the wall. I thought a little decoration may make it more interesting and so considered the series of small arches in the upper photograph which I've pasted into the concept.

You may have noticed the changes between this version of the painting and the previous one. I have added in some atmospheric perspective on a new layer set to Hard Light, using a blue/grey (R156, G181, B188) at 25% Opacity (**Fig.06**).


Fig.06

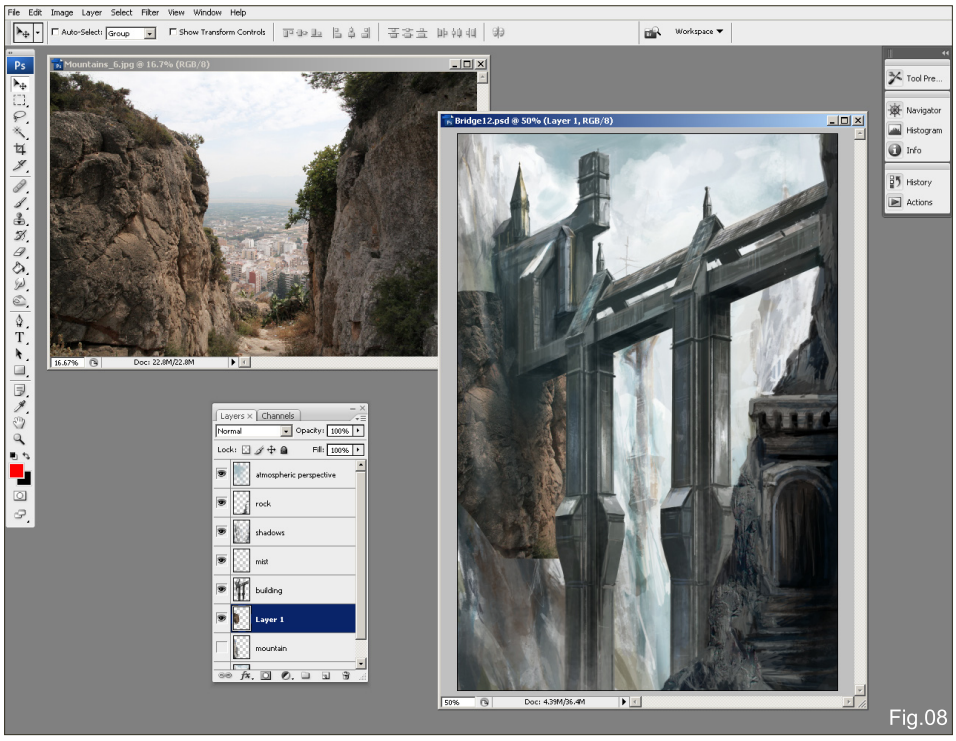
To emphasize the scene's altitude I've painted in some mist along the bottom of the picture which also serves to help separate the bridge from the foreground (**Fig.07**). I felt that the shadows and overall tonal range needed more contrast, and so I added a new layer set to Overlay and painted in some extra shadows and highlights.


Fig.07

As this is not an exercise in concept painting I've chosen not to refine the painting too much – just enough to give me a reasonable idea about where to start once inside 3d Studio Max.

Using Photography to Add Texture

One last stage which helps add some textural detail is the inclusion of photographs into the painting process. Once you paste in your photographs you will need to adjust the color and contrast to suit the lighting and tonal range within your scene. You can either set the blending mode of the photos to Overlay or Soft Light, but quite often I prefer to color adjust them using Curves, Levels and Hue/Saturation, keeping the blending mode at Normal.


Fig.08

Here is an example: in **Fig.08** (you can find this photo on 3DTotal's Free Texture & Reference Image Library) you can see a section of the left rock face in the upper left photo has been copied and pasted into the concept under the building layer. At the moment it is entirely the wrong color and doesn't match, so the first port of call will be to go to Image > Adjustments > Curves and alter the values, as shown in **Fig.09**. You can see the eventual rock texture below this, but you get an idea about how it better matches the lighting now.

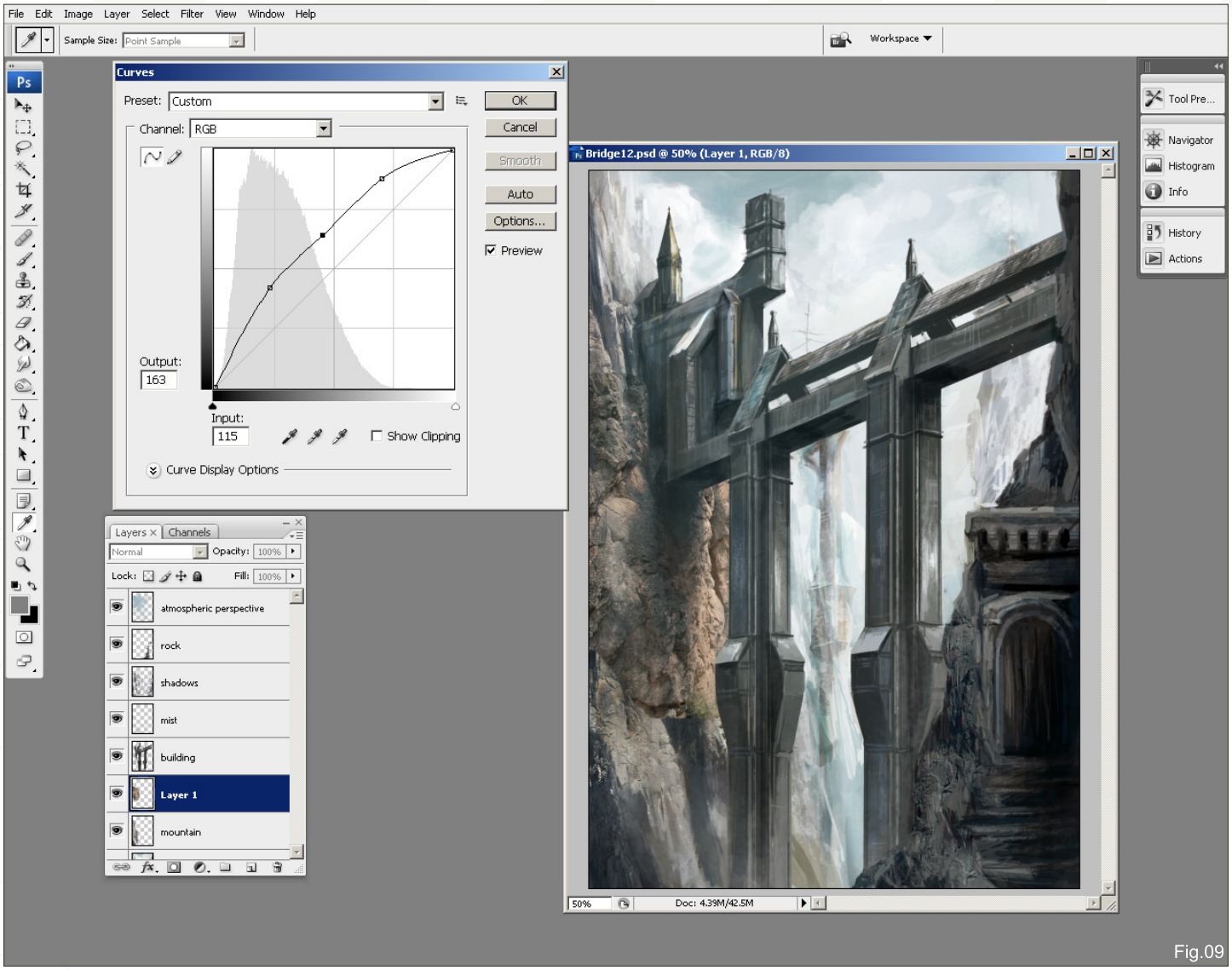


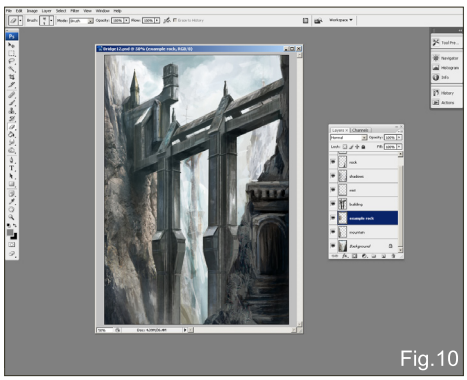
Fig.09

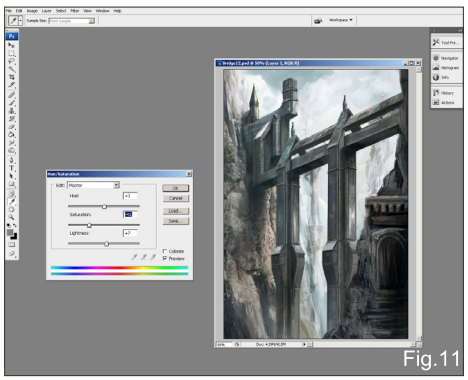
The next step is to alter the color and reduce the warm tones which we do via Image > Adjustments > Hue/Saturation. In **Fig.10** you can see how the middle slider has been moved to -4, which is essentially desaturating it. Now all you need to do is use the Eraser Tool to blend in the edges with the background (**Fig.11**). You will notice the example rock has been pasted over the original layer in the Layers palette.

These techniques will prove valuable when it comes to adding in the backplate, as all the photography will generally require color correcting in order to work together in the scene.

I didn't want to spend too long refining the painting at this stage as it is simply a means to an end and just a way of generating a starting point for the modeling phase. Here is the final version with a little perspective correction (**Fig.12**).

In the next chapter we will see a general overview of modeling the basic elements that make up the scene, and see how 3D packages can be used to build the main volumes, establish both the perspective and camera angle, as well as provide a light source.

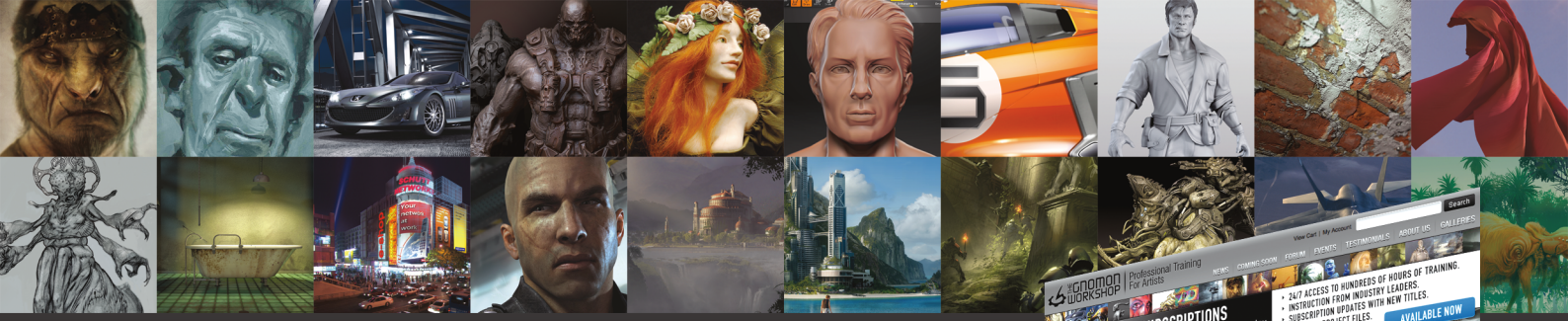

Fig.10


Fig.11

RICHARD TILBURY
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Fig.12



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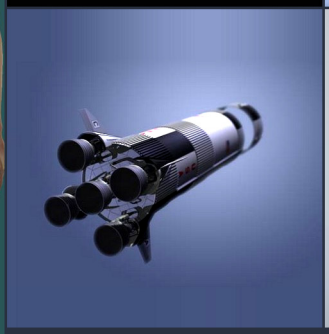
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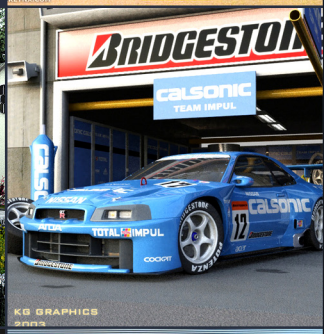



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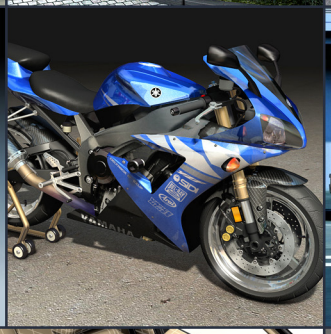
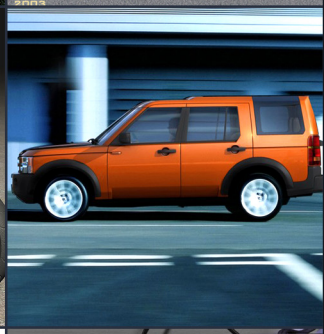
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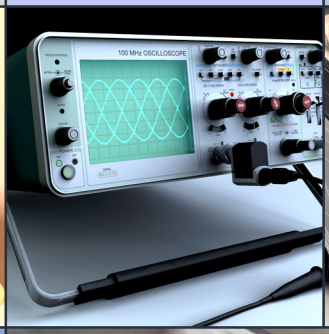




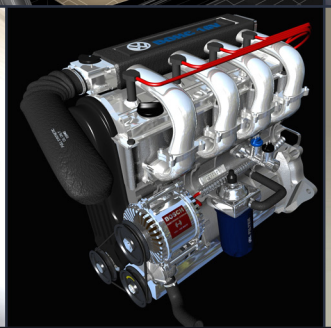










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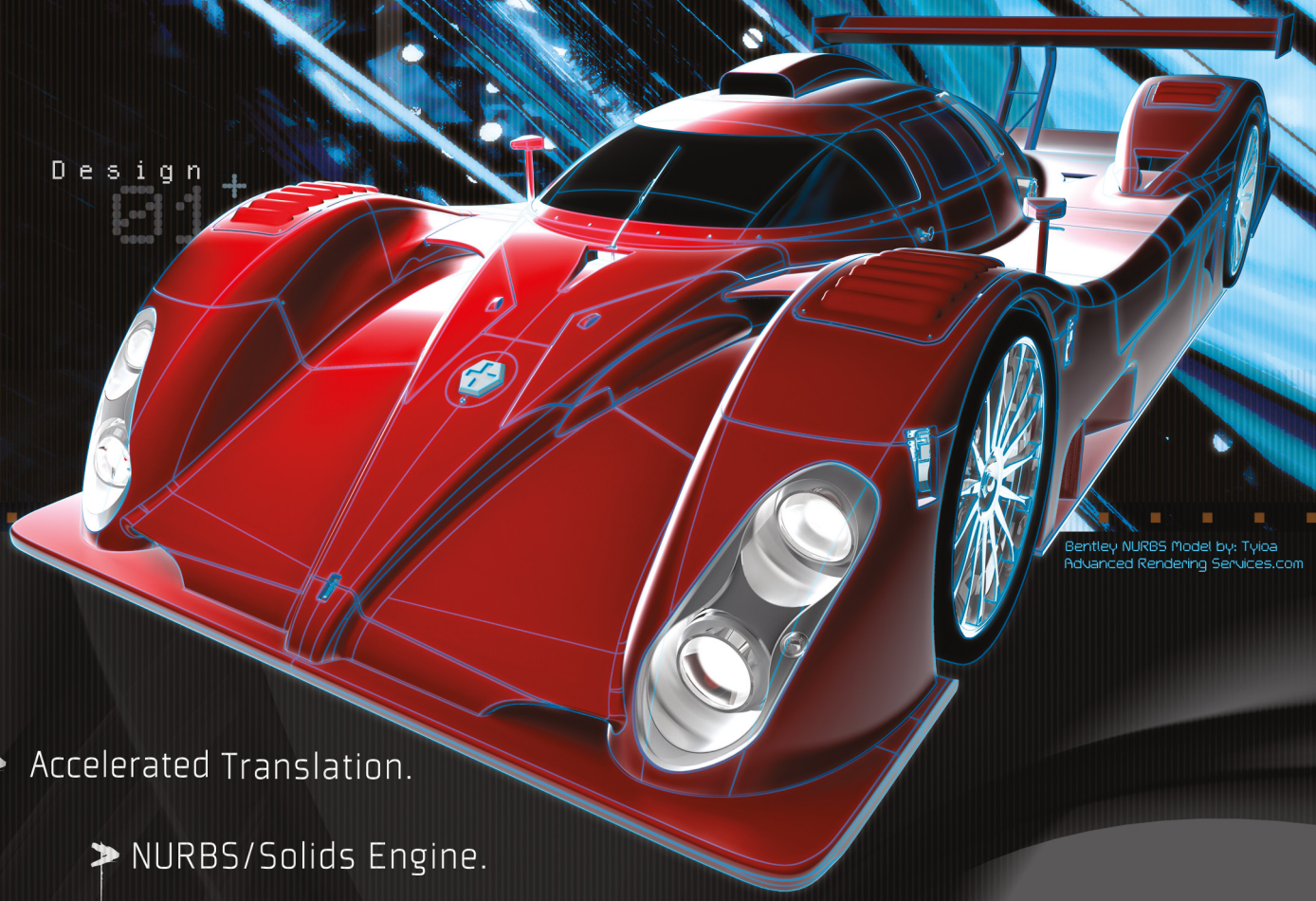
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"I WAS TIRED OF THE RESTRICTIONS OF GAME CREATION (WHICH IS MY DAY JOB) AND WANTED TO MAKE SOMETHING SMALL AND INTERESTING. I'M INTERESTED IN LIGHTING AND TEXTURING SO THIS WAS THE MOST ENJOYABLE PART OF THIS PROJECT."

CONTROL PANEL

MAKING OF BY ANDREW FINCH

Taking a break from the restrictions of the videogames industry, Andrew Finch is here to talk us through the creation of his recent scene, 'Control Panel', created using Max, Mental Ray and Photoshop. With his primary interest in the texturing and lighting, Andrew pulls off an extraordinary render of an otherwise ordinary scene – read on to discover his workflow and get a behind the scenes look at his lighting setup, material settings and render settings, and to find out how he used a "cheap" trick in Photoshop for a classy result!

MAKING OF CONTROL PANEL

Software Used: 3ds Max, Mental Ray, and Photoshop

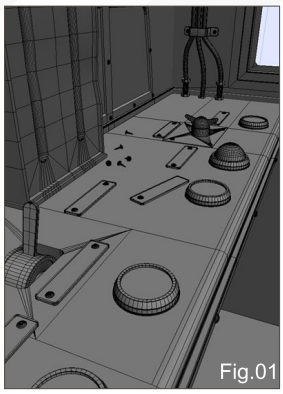
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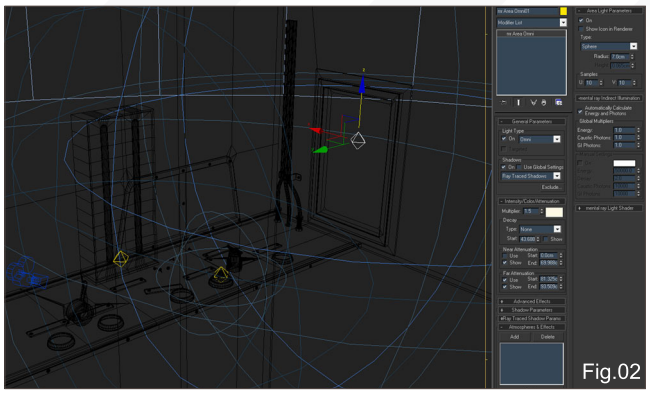
This image was inspired by a reference photo I found on the internet. I was tired of the restrictions of game creation (which is my day job) and wanted to make something small and interesting. I'm interested in lighting and texturing so this was the most enjoyable part of this project.

The whole image took about a week to make during my lunch hours, and was created using 3ds Max 2009 and rendered using Mental Ray. Textures and post work were done using Photoshop CS3. I hope you enjoy this little tutorial.

MODELING

The scene is reasonably simple and modeling didn't take too long. The shelf and walls were created using a simple plane and extruded edges to create the detail. The holes in the shelf were made using Booleans to carve them out – a little tidy-up was needed to create a nicer curve around the edges. The buttons were cylinders extruded and beveled to create the desired shape. Every object in the scene was created using these techniques; I didn't want to over complicate the modeling phase as I wanted to concentrate on the lighting, texturing and rendering of this project. Here is a wire frame render of the scene (**Fig.01**).


Fig.01


Fig.02

I decided to move on to the lighting at this point to establish the mood I wanted to set. This would help with the texturing later on.

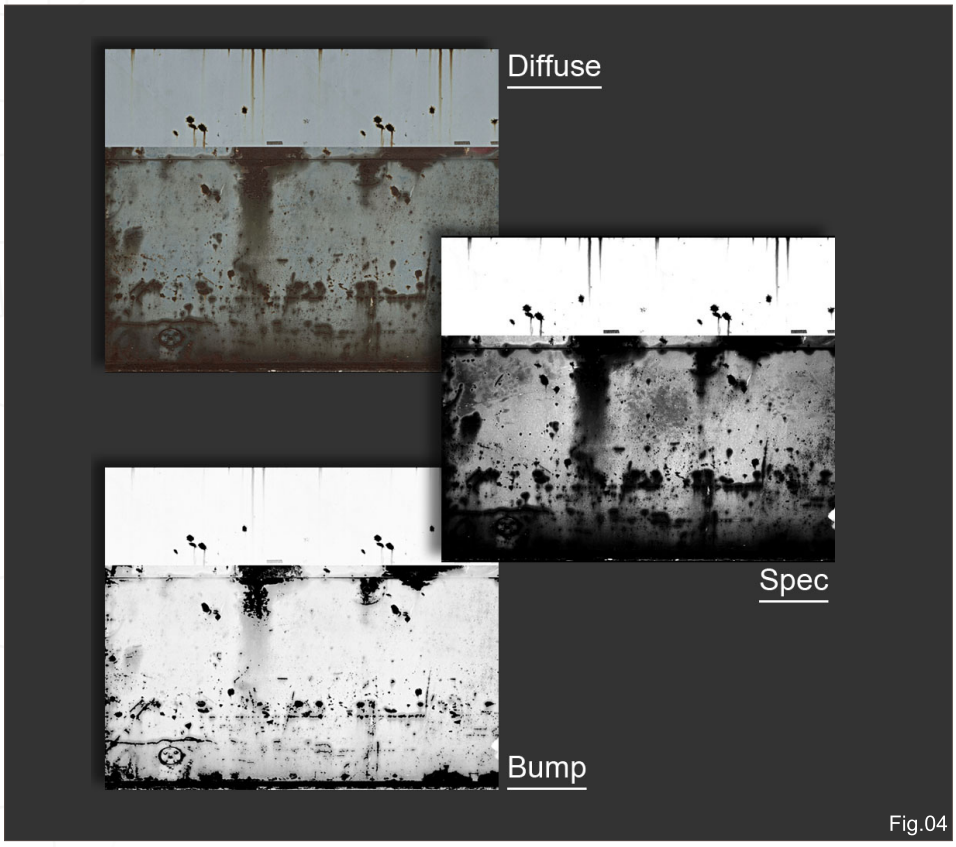
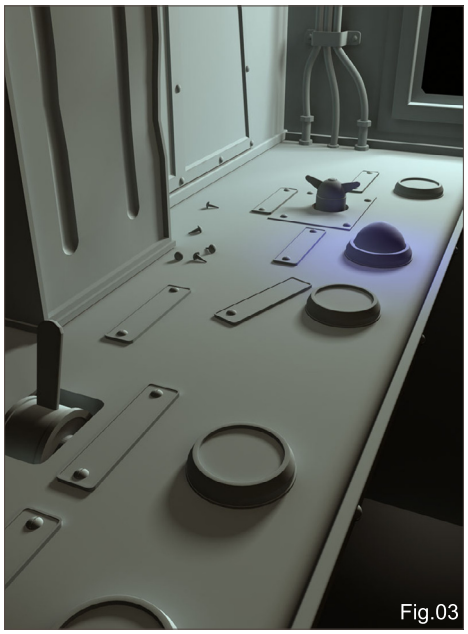


Fig.04


Fig.03

LIGHTING

I find the trick with lighting is to keep it simple. With this in mind, I only used three lights for the whole scene. I used MR Area Omni lights; this would give me the feathered shadows I wanted. Here is my lighting rig with the settings I used for the lights (**Fig.02**), and here is a clay render showing just the lighting (**Fig.03**). Please note this is not the finished lighting setup; I wanted to create the mood first using lighting, which would be further tweaked after the materials and textures were created.

TEXTURING

I used Mental Ray's Arch & Design material system for this project, as they are very good at metal materials. The Arch and Design materials have some good preset settings to create all sorts of realistic materials and are a good starting point to create your custom setups. I

also used a HDR image in the reflection map slot. This helped a lot in achieving a realistic metal look instead of relying only on the environment reflections. Here is an example of the Diffuse, Specular and Bump maps I used (**Fig.04**), and here is the material setup I used for these textures (**Fig.05**).

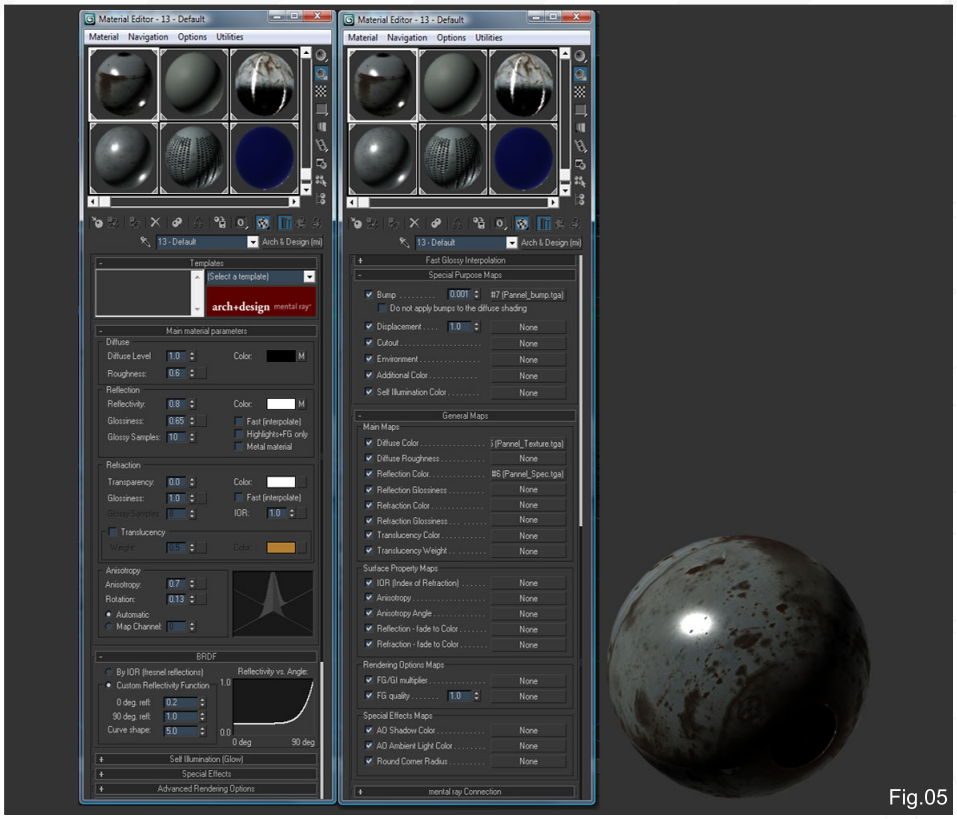


Fig.05

Rendering

Because the materials are quite complex and took a long time to render, I set my render tests to a very low quality. This is good practice anyway and will speed up your workflow. The last thing you want to be doing is waiting around for test renders! I used the default Draft settings for the tests and kept the render size down. Once I was happy with my render and the lighting, and the texturing looked reasonable, I moved onto a larger render.

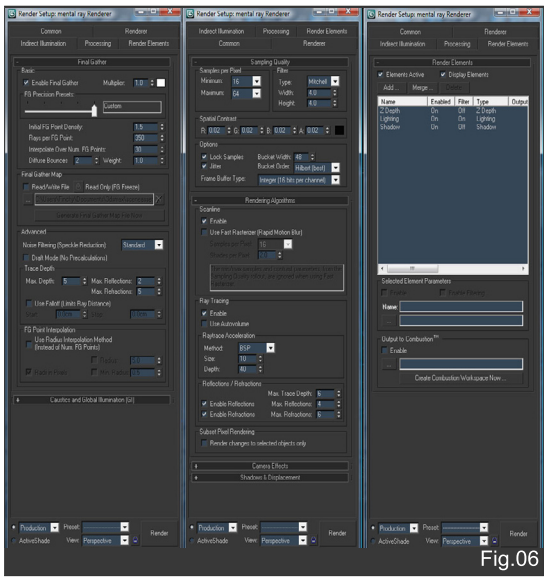
This render had slightly increased settings, such as bounce and Final Gather rays cast. Once this was completed and I was happy with the result I added some render elements to help me in the post-production stage of this project.

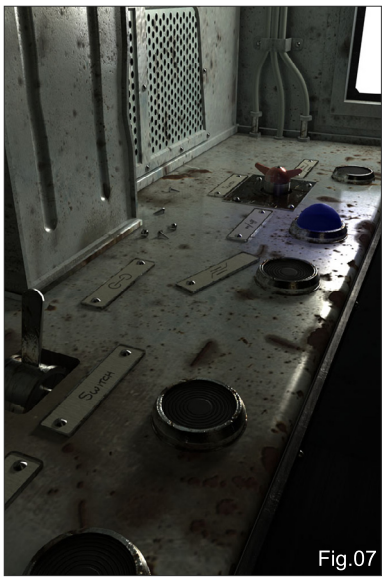
Render Elements

I rendered out two elements as well as my final render image. I then imported these elements into Photoshop to help me polish the image and get it finalized. You may find that you don't need to use some of the render elements you create, but it's always good practice to have them saved just in case you need them.

Here are the render elements I used:

- **Beauty Render** – This is the actual render from Max
- **Shadows** – This is a render of the shadows in your image. You can use this to adjust the shadows and add more depth to an image
- **ZDepth** – This is a render of the depth in your image; you will be given a black and white gradient render – white being closest to you and black furthest away


Fig.06


Fig.07

> "I consider the render out of Max to be just the start of the final stage"

With all the elements set up, I moved on to my full-sized 100% quality render. You must be sure you're happy with all your tests before you do this as your PC will be rendering for quite some time. I think the render time for my full image was about 45 hours straight (it's a good job I have a laptop!). Here are the settings I used for the final render (**Fig.06**), and here is the final render from Max (**Fig.07**).

Post-Production

With the final render done and all the render elements saved, it was time to open up Photoshop!

I consider the render out of Max to be just the start of the final stage. It would be very difficult

and time-consuming to get a good result directly from the Max renderer, so I used Photoshop to do color correction, adjust brightness and contrast, add atmospheric effects, and depth of field. All these corrections can be done in Max, but like I said, it would take a lot of time and test renders to get a decent result and is just not worth it – Photoshop will give you much more freedom and control over your image.

"…THIS STAGE WAS QUITE IMPORTANT TO GET RIGHT BECAUSE IT ADDED SO MUCH TO THE PHOTO REALISM"

I started by adjusting the levels to bring out the dark values. I then adjusted the Color Balance to achieve the desired effect, which in this case was photo realism. I wanted a warmer feel compared to the original render so I added more red; this helped to bring out the rust. Using the shadows element render I set the layer to Multiply and adjusted the Opacity to get a good result.

I then added depth of field using the ZDepth element; this stage was quite important to get right because it added so much to the photo realism look that I wanted to achieve. Photoshop CS3 has a very good Lens Blur

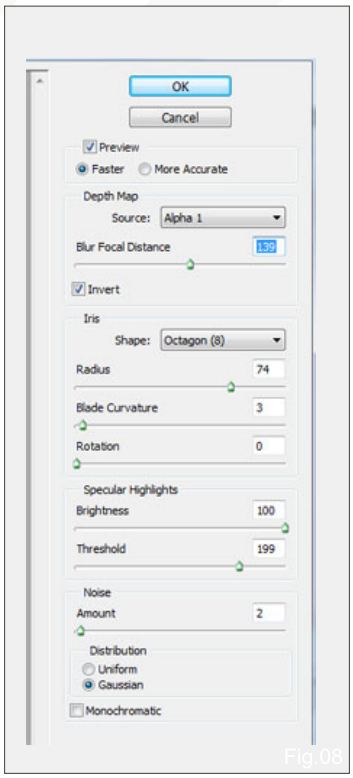
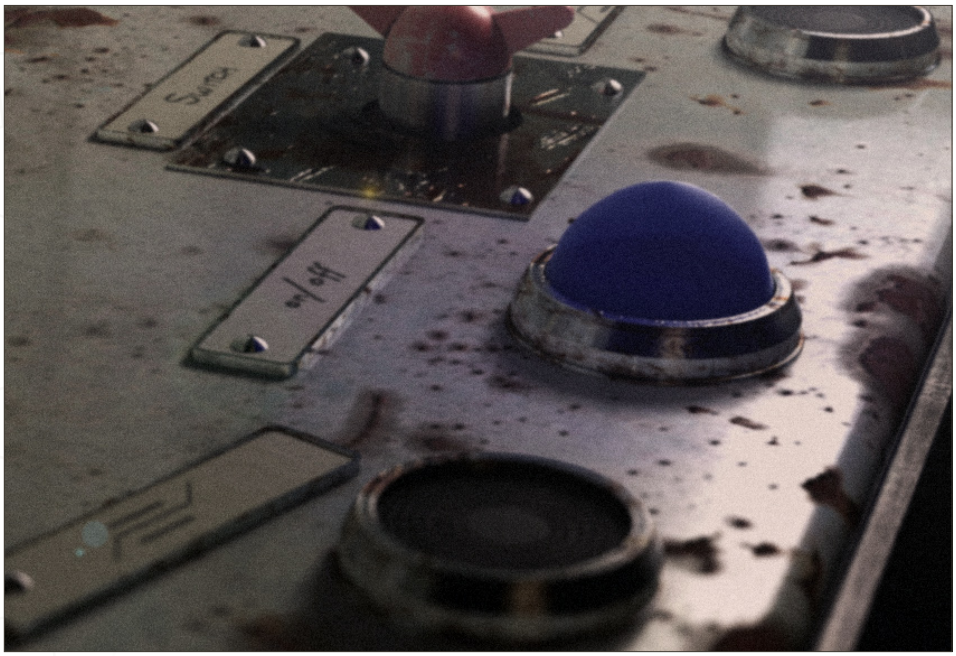


Fig.08


Fig.09

Filter effect which adds nice little details that you get from photography, such as noise and hexagonal shapes created by blurred specular highlights. So, using the ZDepth image, I copied and pasted it into the Alpha channel of the Photoshop layer and applied a Lens Blur Filter. Here are the settings I used for the filter (**Fig.08**). As you can see, it's quite a powerful filter!

Now for the lens flare! I know it's often considered a cheap and tacky addition to any image, but if used correctly – and in moderation – it can add a lot to your image! In a new layer I added a 105mm Prime Lens Flare in the top right corner. I think it's the circular discs that get positioned across the screen that cheapen the image, so I erased those to about 20%. The main focus was to get a strong glare from the window.



I added a small amount of noise to the whole image to give it that "photographed" feel. I then gave it one last adjustment pass of Levels, Curves and color correction to achieve my final image (**Fig.09**).

So that's it! I hope my descriptions have been easy to follow and have given you a helpful insight into how I created this image. It was a pleasure making this image and making of. Any questions please get in touch. Thank you!

ANDREW FINCH
For more from this artist please contact him at:
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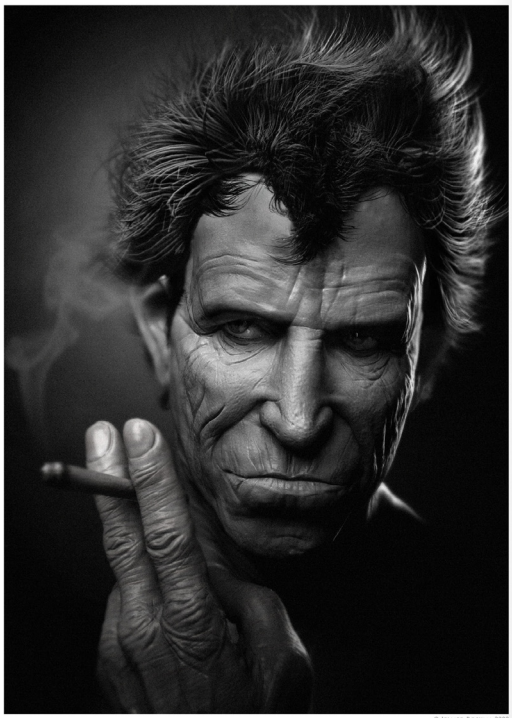
This month we feature:

"Portrait of Keith Richards"

by Jelmer Boskma



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Portrait of Keith Richards

By Jelmer Boskma

Software Used: Softimage XSI, ZBrush and Photoshop

Introduction



It all started in a Vancouver theatre around May 2007 where I watched the third part of the *Pirates of the Caribbean: At World's End* for the first time. About half way in, Keith Richards made his introduction in the role of Captain Teague. When he appeared on screen I had goose bumps; the way Keith looked in his red pirate costume reminded me so much of an illustration of the infamous pirate, Blackbeard, in a children's pirate book I used to own – I loved that image and have kept it in my head ever since. A few months later, Disney released the book *The Art of the Pirates of the Caribbean* where I once again met with Captain Teague. This time he appeared in the form of an amazing drawing done by one of my heroes, Mark "Crash" McCreery. There the idea was born.

I felt it was time to add something new to my portfolio, and this would be something I'd very much enjoy doing. Although I started off with the intent to create a portrait of Keith Richards as Captain Teague, he never made it to that state. I changed my mind during the process and decided to go for a realistic portrait of the man himself instead. Well … at least it got me a good "piratey" introduction for this article – Yarr!

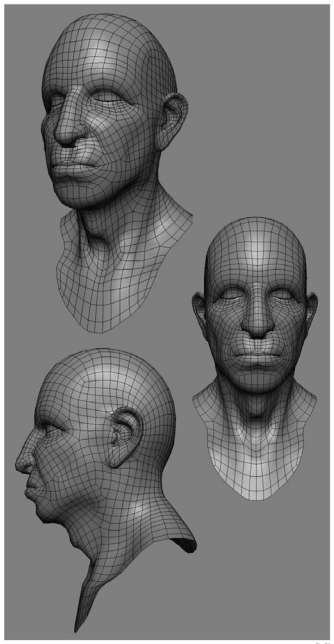


Fig.01

References

I started off the way I usually start any project, which is by gathering related reference imagery. I found a couple

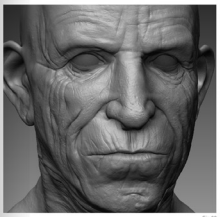


Fig.02

The following shots of the "Portrait of Keith Richards" book pages are featured here in full-resolution and can be read by zooming in...

of decent photos of Keith and also took some screen grabs from the movies, where I had the opportunity to see him from more specific angles. During my search for references it was inevitable that I came across some of the famous caricaturist, Sebastian Krueger's work. He has portrayed and caricaturized the Rolling Stones, and Keith personally, quite a few times. Throughout the process I constantly had to be aware not to caricaturize my portrait too much. Keith has got a lot of characterizing features in his face, and sticking close to his real proportions, instead of caricaturizing them, was a challenge!

Modeling

I mocked up a base mesh for the bust in XSI fairly quickly, with the idea to get working on the likeness in ZBrush as soon as possible. I kept the base model very simple, since it would be used for still purposes only, and wouldn't have to deform (**Fig.01**).

Sculpting

When doing a likeness, details hardly matter; it's the main proportions that matter, and in particular the visual triangle indicating the relations between the eyes and tip of the nose. I found that once you nail those proportions, the character usually starts to become recognisable. You do start to stare blind after a certain amount of time, so I tried to get as much of the main work done as possible within the first hours after starting work on the model.



Fig.03

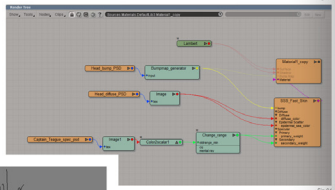


Fig.04

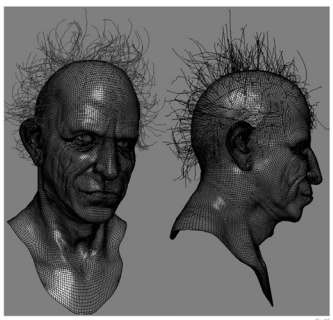


Fig.05

I tend to start off by subdividing the model about three times right after importing it into ZBrush. From there I start to refine and build the main forms. I have become a big fan of the Clay Tubes tool, which allows me to change and add volume in certain areas in a very natural way. After getting the bigger primary forms down I carved in a couple of Keith's most characterizing wrinkles, which are formed mostly around his mouth and cheekbones. Having a dual monitor setup was most helpful for this project: I find that being able to have my main reference images up on one screen, while working on the other, is almost mandatory for this kind of work. Once I started sculpting it was just a matter of constant refinement: looking at the reference photos and comparing them to the model. I didn't really find any shortcuts or tricks doing a portrait – it seems to be just a matter of training your eye and trying to sculpt what you can see (**Fig.02 – 03**).

Texturing & Shading

The texture painting was completely done in ZBrush as well. Using the polypaint tools I quickly painted a diffuse

texture directly on the model. Knowing the final image would be black and white, I didn't spend too much time on this.

After having exported the diffuse map from ZBrush, I hooked the image up in a pretty simple shading tree using Mental Ray's standard fast skin surface shader (**Fig.04**). I applied this to the high-res model, right out of ZBrush. The model sits at about 2 million quad polygons at its highest subdivision level, and I sadly wasn't able to render this in XSI without crashing my machine. I ended up exporting the second highest resolution mesh and generating an additional map, based on the volume differences between the highest two levels and applied this as a bump map to the model in XSI.



Fig.06

Hair

The hair was done in XSI, too – the hair tools are great and pretty easy to use. I grew about eight different selections of hair to form his haircut. I looked at sections

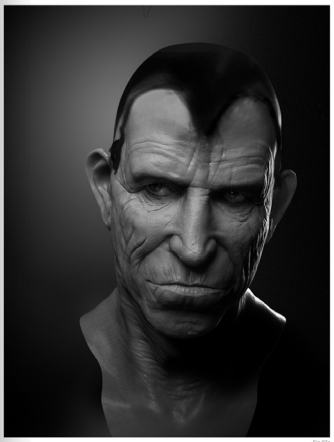


Fig.07a



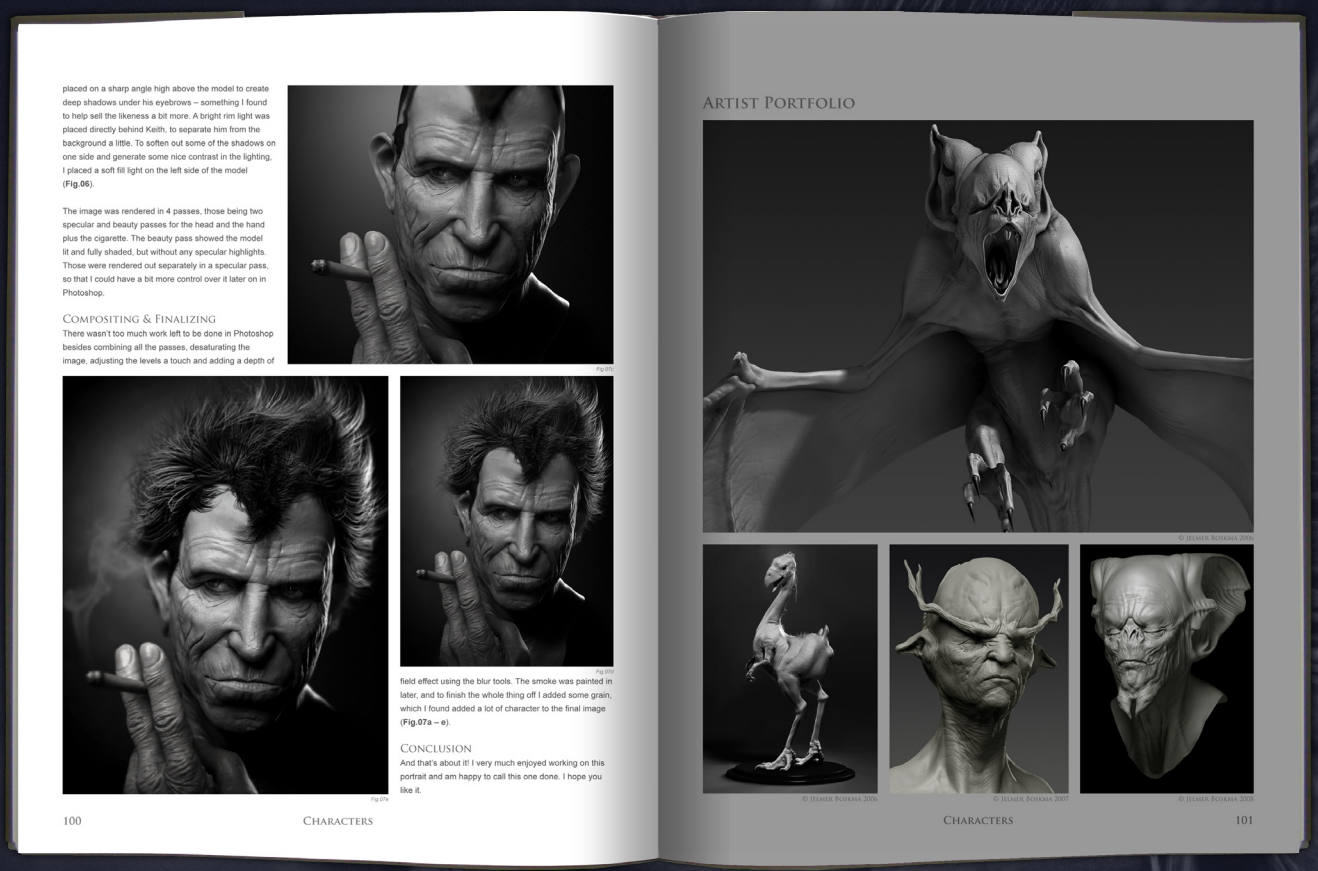
Fig.07b

and strands that characterized his hair most to base my hair selections on, and focused on those specific areas. The hair was very much modeled to the camera, and looks rather ridiculous from any other angle (**Fig.05**).

Lighting & Rendering

The final light rig was made up out of a standard three-point light setup using area-lights. The key light was

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placed on a sharp angle high above the model to create deep shadows under his eyebrows – something I found to help sell the likeness a bit more. A bright rim light was placed directly behind Keith, to separate him from the background a little. To soften out some of the shadows on one side and generate some nice contrast in the lighting, I placed a soft fill light on the left side of the model (**Fig.06**).

The image was rendered in 4 passes, those being two specular and beauty passes for the head and the hand plus the cigarette. The beauty pass showed the model lit and fully shaded, but without any specular highlights. Those were rendered out separately in a specular pass, so that I could have a bit more control over it later on in Photoshop.

Compositing & Finalizing

There wasn't too much work left to be done in Photoshop besides combining all the passes, desaturating the image, adjusting the levels a touch and adding a depth of field effect using the blur tools. The smoke was painted in later, and to finish the whole thing off I added some grain, which I found added a lot of character to the final image (**Fig.07a – e**).

Conclusion

And that's about it! I very much enjoyed working on this portrait and am happy to call this one done. I hope you like it.

Artist Portfolio

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3ds max

NEXT GEN CHARACTER CREATION SERIES

This series of tutorials provides a comprehensive guide through the process of creating a 3D character intended for use within a next gen console environment. As such, the design of the model will be tailored towards the eventual aim of functioning within a game engine and viewed in real-time. The series will cover all of the key stages of the 3D pipeline from sculpting the initial mesh in ZBrush and optimizing it in the principal 3D packages, through to texturing and applying next gen shaders. The inclusion of ZBrush tutorials will address the methods of sculpting both a low-poly mesh as well as a highly detailed version used to generate a normal map, and accompany the remaining software specific chapters that will detail topics that cover mapping, materials, lighting and rendering.

Chapter 1 – Low Poly Modelling | Jul 09

Chapter 2 – High-Poly Modelling Part 1 | Aug09

Chapter 3 – High-Poly Modelling Part 2

Chapter 4 – Mapping / Unwrapping | Oct 09

Chapter 5 – Normal Mapping – Texturing

This chapter deals with the texturing part of the series and looks at how to generate normal maps, baking out lighting effects, and the techniques of painting in Photoshop using the aid of photographic reference. Seamlessly blending in photo references with hand painted techniques are a feature, as well as a section on painting eyes.

Chapter 6 – Materials, Lighting & Rendering | Dec 09

DOWNLOAD RESOURCES

- Free Low Poly Base Mesh & Textures





CHAPTER 5 - MAPPING / UNWRAPPING

Software Used: ZBrush, 3ds Max, xNormal (freeware – http://www.xnormal.net/), Photoshop

In the last part we looked at UV-unwrapping our character. This month we'll follow on from that by generating normal maps, baking out lighting using the free programme XNormal, and painting our textures in Photoshop.

Normal maps revolutionised the games industry a few years ago, more specifically around 2003 when the original Xbox started to release titles that included normal maps. The Sega Dreamcast being the first normal map ready console, the Xbox was the first to really utilise them widely and catch the public's eye. They added another level of detail and realism to games, and now almost every new game includes normal mapping in some form.

Normal mapping in videogames works by having a high- and low-polygon mesh. A computer-calculated map alters the normals of an object in realtime to visually make the low-poly object look like the high-poly object, but without adding any more polygons. It reacts to lighting as the high-poly would and, with technologies such as CryEngine's occlusion maps, can even simulate shadowing in the recessed areas.

The normal map is usually a 3-channel map with each channel corresponding to one of the three axes – X, Y, and Z. Sometimes the alpha channel can also contain a height map. There are a number of different software and plugins out there to generate normal maps now,

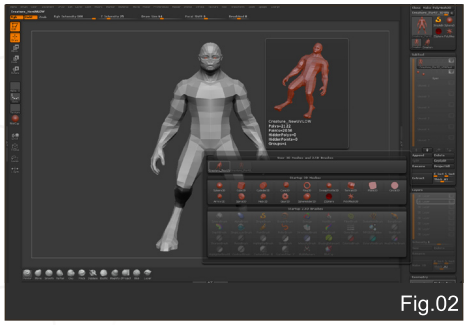

Fig.02


Fig.01

and most applications have some built-in way of calculating them. 3ds Max has 'Render to Texture', Blender can calculate normal maps out of the box, and ZBrush has it built in and also comes with ZMapper. Tools like XNormal, CrazyBump, PolyBump, and others, all simplify the process in their own way, too.

1. Load up the model in ZBrush as normal, using the Tool > Open menu. Drag the model onto the canvas and press Q on your keyboard to make it editable. Now, the first thing is to export the highest resolution version. It's close to 2.5 million polygons, so don't be surprised if it takes a while to export. Make sure you are at the highest subdivision level and hit Tool > Export, then name it appropriately and wait for exportation (Fig.01).

2. Now let's move on to creating a normal map from within ZBrush. There are a couple of ways to do this – one being to use the ZMapper plugin, which comes with numerous options to export an optimal normal map. Another way is to simply use the default ZBrush normal map generation, which I will do here. Drop down to the lowest subdivision level by pressing Shift + D. Now switch to the ZSphere tool. Go to Tool > Import and import the final unwrapped character mesh from last month's tutorial. To calculate the normal map from within ZBrush, the topology must be the same for the high and low resolutions of the mesh. Therefore, we will need to project the detail from our completed high poly sculpt onto a divided version of the new low-poly.

With the low-poly model imported, switch back to the original high-poly sculpt and expand the Subtools palette. Click on Append and select the newly imported low poly (Fig.02).

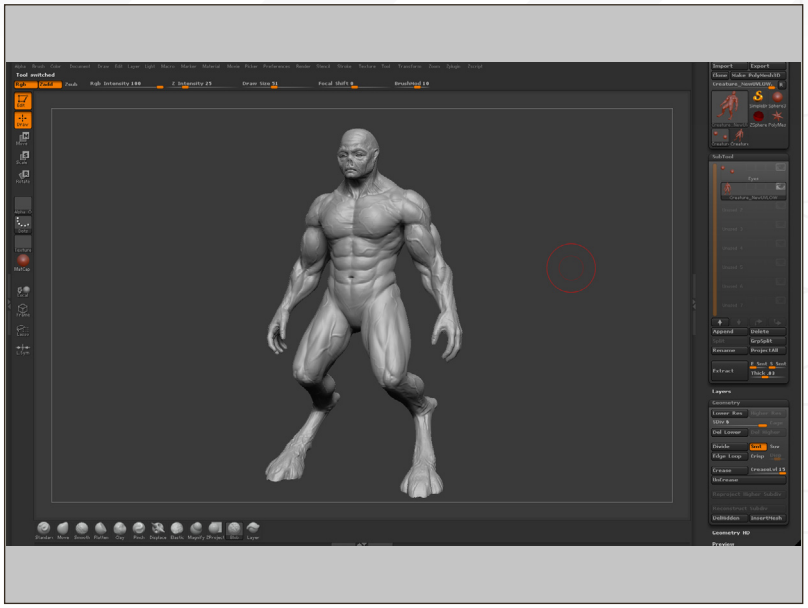
3. Under Geometry, click on Divide and match the resolution of the original. My original high-poly sculpt had 6 levels of subdivision, so I'll divide the new mesh to that level also. Hide the eye model by clicking on the eye icon on the right of the SubTool. Make sure your new model is selected. You can see which SubTool is active as its name will be darker and the SubTool ringed with a border.

Now click on the button labelled Project All. This will project all the detail from our high poly model onto our low poly one. If you kept other SubTools visible it would project those onto the new model also, so it can be useful for creating single meshes in a lot of situations. Projecting all can take some time, depending on the amount of polygons your mesh has.

Once the projection is complete, delete the original high-poly sculpt and you're left with what is hopefully an identical version with our

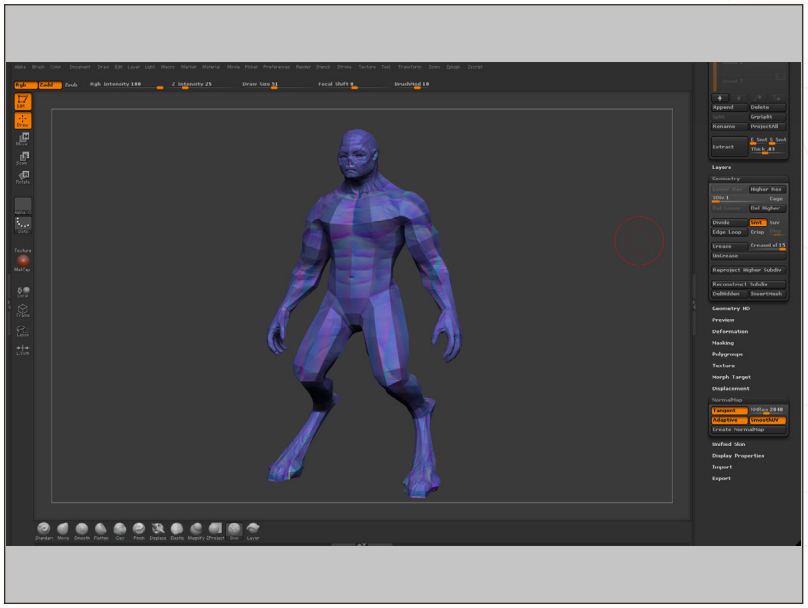
new final unwrapping. If there are areas where a few polygons are sticking out or stray use a Standard brush and smooth them back into place. Sometimes you may need to re-sculpt small areas, but usually the projection is quite accurate. It can help to open the Brushes menu and turn on Cavity Mask, which will retain any surface detail you may have added already, whilst allowing you to work on the mesh (**Fig.03**).

Fig 03



4. Now we'll move on to generating the normal map. Go to your lowest subdivision level, scroll down inside the Tool menu to NormalMap, and expand the palette. Inside of this we have a few options that can help us generate a better looking normal map.

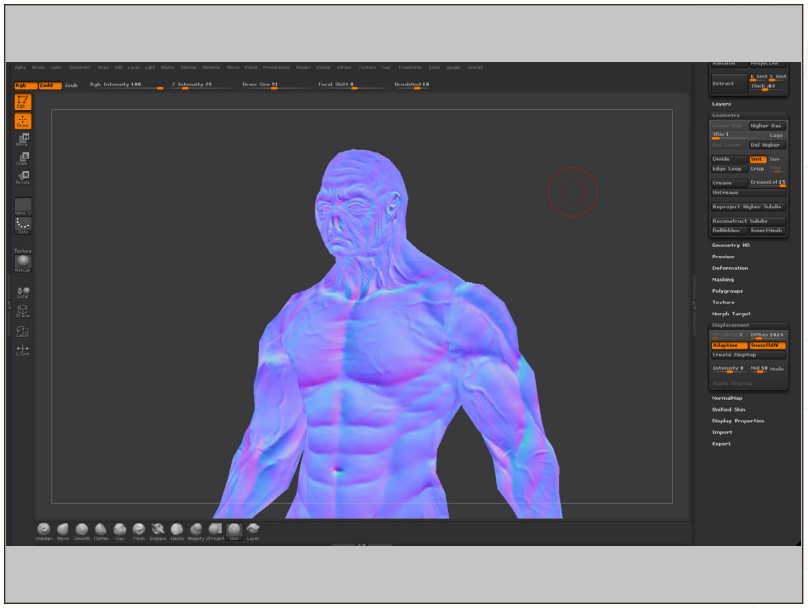
Fig 04



- **Tangent** – If pressed, the co-ordinates of the normal map are tangential or local to the object. If unselected they are in 'world space', or global. A good rule is that if the object is to be static in the world, you can use global, but if the object will be moving or deforming you can always use tangent space

- **Adaptive** – If pressed, the map will be more detailed in areas of more concentrated detail. It sounds like common sense but it takes longer overall to render the map if this is selected. To save a small amount of time in testing you can turn it off, but I recommend keeping it on most of the time

Fig 05



- **NMRes** – Forget the confusing name; I don't think there was enough space in the tool palette to write something clearer. This is simply the normal map resolution, or map size. In our case it will be 2048, and as all maps are square there are no height and width specific fields

- **SmoothUV** – When pressed, UV coordinates are smoothed when calculating the map. If your map appears faceted somewhat, make sure this is pressed

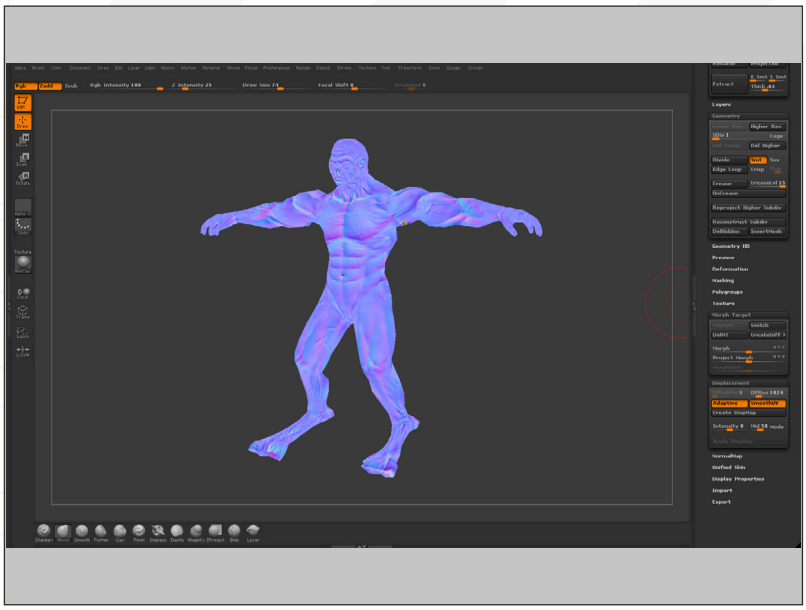


Fig 06

Go ahead and click the Create NormalMap button and wait for it to complete its calculations (**Fig.04**).

5. The normal map now appears as a texture map on our model. To export it, we can go to the Texture menu and click Export, as it's already the active texture. Name it accordingly and save it as a .psd for optimal quality.

Go to the Render menu and select Flat Shade so you can check if any sections of the map have been miscalculated. You will be able to see the texture with full self illumination, making it easier to spot errors (**Fig.05**).



Fig 07

6. The normal map looks good to me, with very few errors at all. The only error is in the area on the back of the legs where the upper and lower legs are very close together. Since we are inside of ZBrush and our low- and high-poly models are essentially both the same, areas like this are surprisingly easy to fix. Simply drop to a low subdivision level and, using the Transpose tool, straighten out the leg slightly and raise the arm up a little bit. I know what you're thinking: 'I don't want to destroy my mesh!' That's where ZBrush pulls another trick from out of its seemingly never-ending sleeve. Under the Tool > Morph Target palette before you start to transpose, hit the button labelled StoreMT. We have now stored a morph target, so after we create the normal map we can drop back to it as if nothing happened.

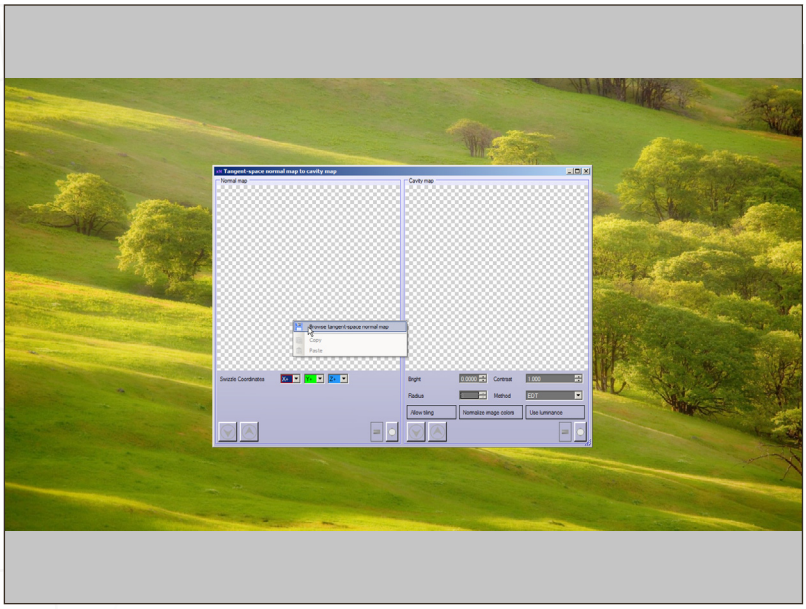


Fig 08

Go ahead and make the changes to the model using Transpose by moving some limbs out of the way. If you are getting errors in the hands, also move the fingers further away from each other (**Fig.06**).

7. Once you are done, recalculate the normal map, check the errors, and hit the Morph Target > Switch button. The model will revert back to its original position, but this time with the newly calculated normal map.

Switch to your lowest subdivision level and export this model to a separate folder. Label it accordingly, and then in the same folder export the highest resolution model. The second will take a little longer but we only need to do this once.

These meshes will be used for calculating our light baking, or ambient occlusion maps from within xNormal. We export these models because, in order to create good optimum maps, the low- and high-poly models should have the same UVs. It speeds things up and cuts down on the time needed to create cage meshes, and other solutions to block rays from hitting parts of the model where we don't want them to.

We can close ZBrush now, as we won't need it again. The next part of the tutorial will use the software, xNormal. It is completely free and programmed by a real genius and generous guy, Santiago Orgaz. Just head to http://www.xNormal.net/Downloads.aspx and download the latest version of the software. xNormal is becoming widely used in the games industry, with many AAA companies using it on a daily basis.

Of course, if you do not have or do not want to get xNormal you can skip this step and calculate a global illuminate map in 3ds Max using your high-poly object. (I will briefly show you a technique for doing this in a moment.)

On the tutorials section of the xNormal website, you can watch a quick overview of the interface, buttons, and features included in xNormal. I suggest doing this to familiarise yourself with it before continuing (**http://www.xnormal.net/Tutorials.aspx**).

Open xNormal, and click on the Tools button (**Fig.07**).

8. Now click on 'Tangent-Space normal map to cavity map'. This will turn our ZBrush-generated normal map into a cavity map that we can use

Fig 09

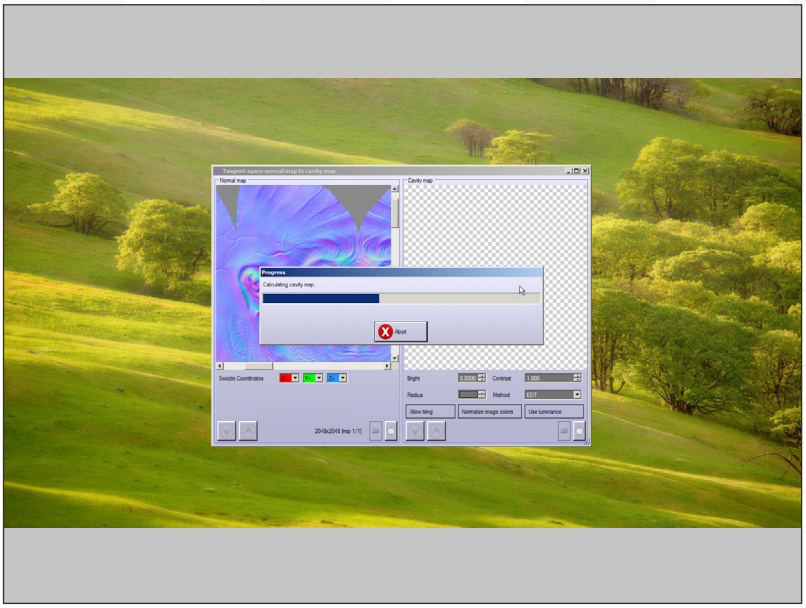


Fig 10

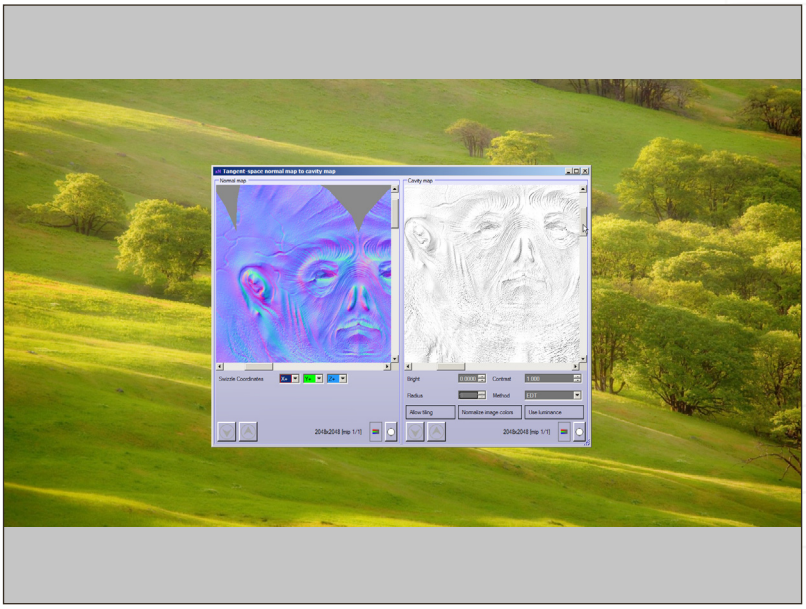


Fig 11



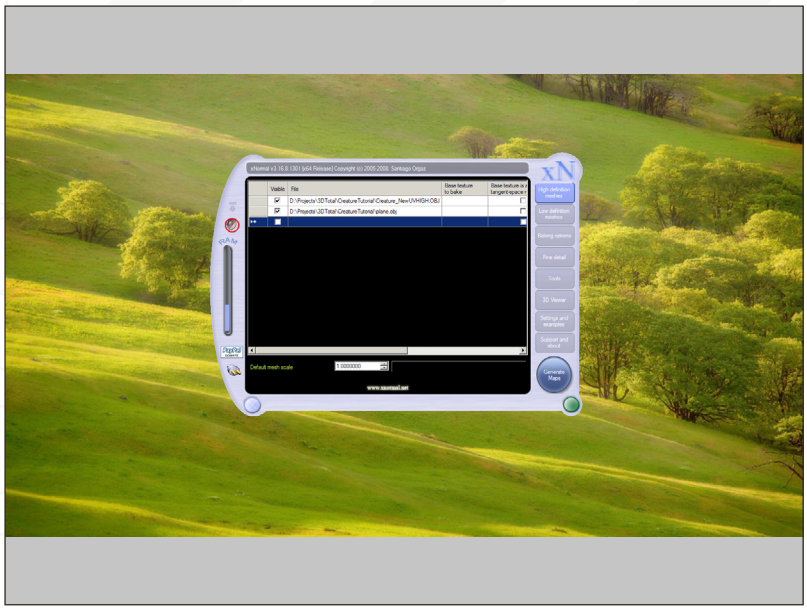


Fig 12

to add detail to our texture almost instantly. Up pops our Tangent-Space normal map to cavity map window; the left-hand side of our map will be converted, and the right is where we will preview the converted map.

Right-click over the left-hand-side box, and select 'Browse Tangent-Space normal map'; once the explorer window opens, navigate to the location you saved the normal map and select it (**Fig.08**).

9. Now right-click over the box on the right-hand-side and click Generate (**Fig.09**).



Fig 13

10. It's really as simple as that. A progress bar will show the time remaining and in a few moments the right-hand side will be filled with the cavity map preview (**Fig.10**).

11. Right-click over the cavity map on the right and click Export Cavity map. Save the file and name it accordingly. We can also modify the settings of the conversion to give us different and interesting cavity results. Try changing the method to EMB and the contrast to 1.5, and regenerating. Export this result also, as both will be useful for adding detail in the texturing.

Make sure to export with a format that allows an alpha channel because, depending on the setting, the white version is usually saved in the alpha channel. TGA will work fine.



Fig 14

At this point we can also produce our ambient occlusion map, which will save hours of time painting the muscles and shading ourselves. We need to jump into 3ds Max first to export another model for the ambient occlusion map generation. Load in your character model and create a simple plane, placing it underneath the character as if he were standing on it. This plane model is needed for the calculation of the ambient occlusion map. Without it, the maps all turn out overblown and white. Once you have made the plane and positioned it correctly, export it as an OBJ to the same folder as before.

Now, back inside of xNormal, click on 'High definition meshes' on the right-hand-side menu bar. Here we have our place to import our high-poly sculpt, along with the plane that we just exported. The plane goes with the high-poly instead of the low-poly, as we are casting rays from the high-poly and filling in the UV map of the low-poly with the results. Any other meshes you want can be placed in the 'High definition meshes' slots to cast shadows. If a character always wears a huge hood, you could also place it in here as a separate mesh to cast shadows on the character (**Fig.11**).

Fig 15



12. Right-click under the File field and click Add meshes. Locate the exported high-poly model, and click Open. Right-click again, select Add meshes, locate the plane OBJ file we exported, and add it (**Fig.12**).

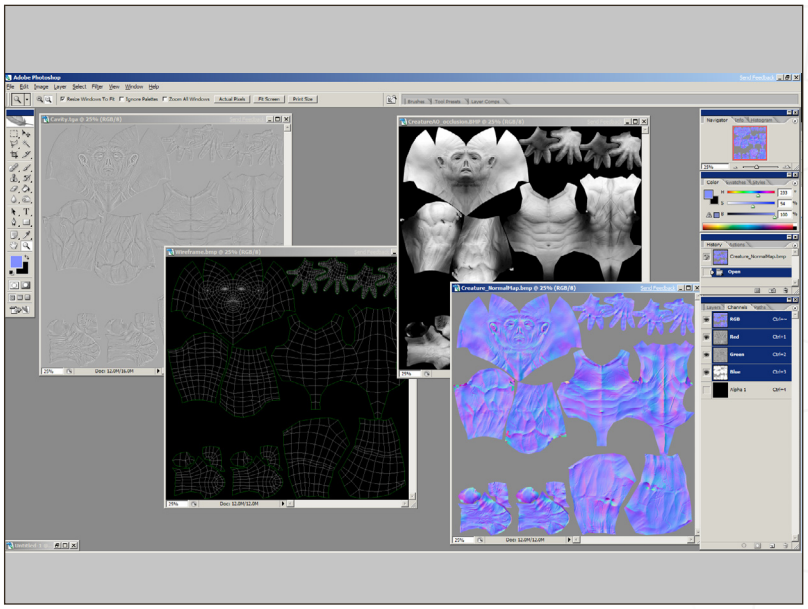
Fig 16



13. Now go to the 'Low definition meshes' tab and, as before, right-click and add the low-poly mesh. There are some important options here that we need to modify, so using the scroll bar, scroll all the way across to the end on the right. Turn on the check box labelled Match UVs. We can also modify the maximum frontal and rear ray distances, but for now a value of 0.600 and 0.800 works well for me. Depending on your mesh it may be different, and some trial and error will find the right result (**Fig.13**).

14. Go on to the 'Baking options' tab and click on the three dots at the end of the Output File section. Type in a name for your map and select a file type. Make sure the size is also at 2048 by 2048. I've set the background colour to black, but white works well too. I suggest following the same settings shown so your output result will be similar to mine as we go through the rest of the tutorial.

Fig 17



Click on the dots next to Ambient Occlusion, under 'Maps to render'. This brings up the Occlusion map window where we can set the options for the way the map will be calculated. The important values to change are:

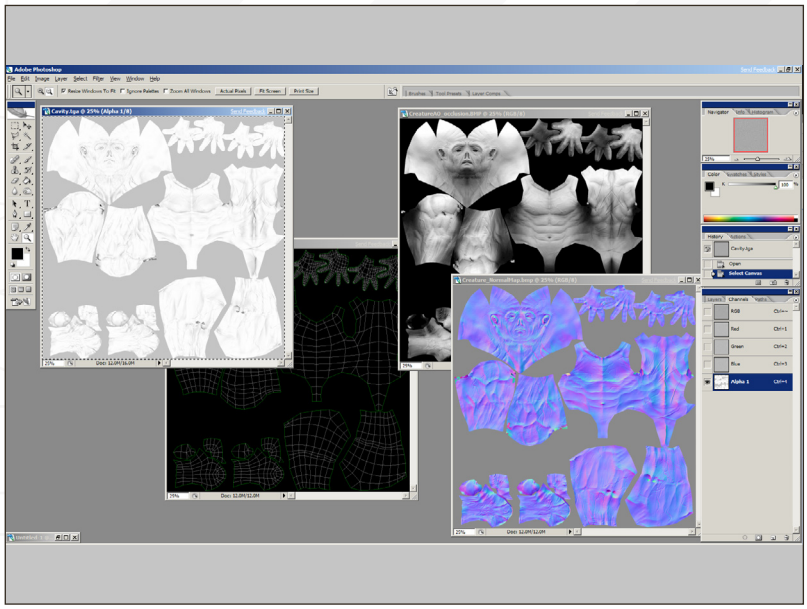


Fig 18a

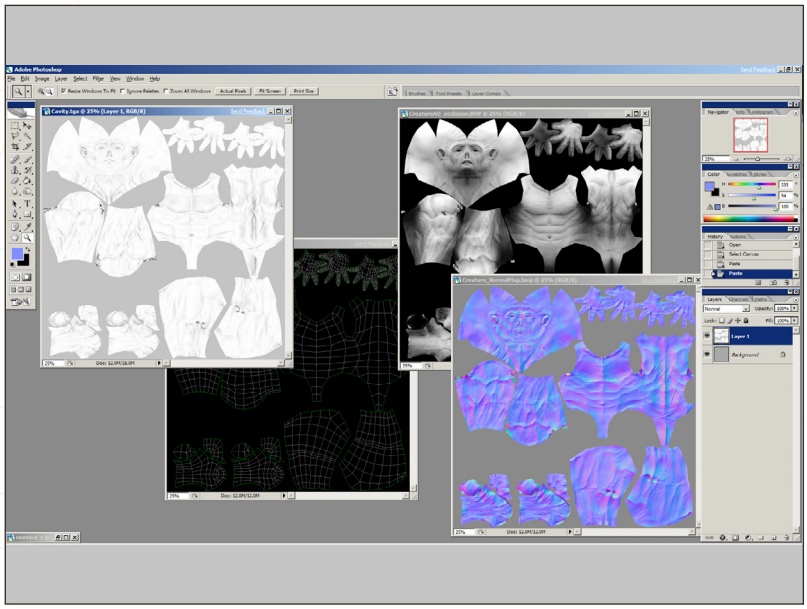


Fig 18b

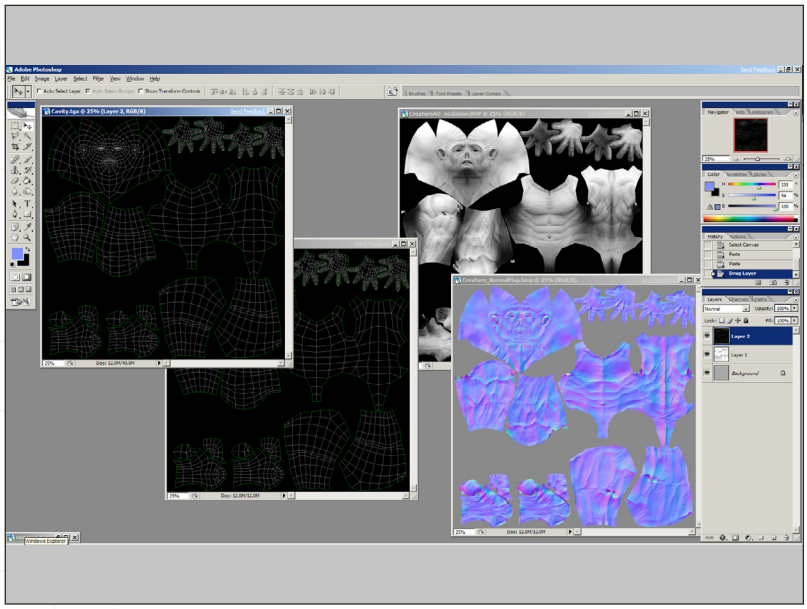


Fig 19

- **Rays** – The number of rays cast from one point on the mesh: a higher value giving a softer and more accurate solution at the cost of render time; a lower value is quicker to render but is dirtier. I find a value of 256 is optimal here

- Leave Occluded Colour and Unoccluded Colour as they are. We can always colourise the map later in Photoshop

- **Spread Angle** – Increase this value for a softer map, with larger forms being smoothed out and smaller detail not picking up much shadowing. Decreasing the value will result in a sharper map, and areas of indentation will pick up more detail. A value of 150.00 will produce a quite sufficient map for our use

- **Limit ray distance** – This option should usually be left off. Most of the results whiteout and become over bright when it's turned on

You can modify the other values to your tastes, but bear in mind we can produce a lot of the same results by calculating the map and editing it in Photoshop later (**Fig.14**).

15. With your settings chosen, all that's left to do is click the big blue Generate Maps button. Notice that once you click it, xNormal jumps into action. You can preview the result of the ambient occlusion generation by clicking on the drop-down box at the top of the Preview window and selecting 'Notify tile updates'. Bear in mind this is noticeably slower than when this option is turned off, so I suggest only using it to check on progress (**Fig.15**).

16. The map is being calculated … Sit back, make a cup of tea, and relax for a few minutes (**Fig.16**).

17. With our ambient occlusion, cavity maps and normal map all ready to be used, we can start to

set up the Photoshop file to create our textures (**Fig.17**).

18. We must open up all of our textures we've created so far in Photoshop. Take the cavity map and extract the alpha by going to the Channels palette, selecting Alpha 1, selecting all by hitting Ctrl + A, copying the selection by pressing Ctrl + C, and then selecting RGB. Now switch back to the layers palette, select the Background layer, and hit Ctrl + V. The alpha should then be pasted in a new layer above the background (**Fig.18a – 18b**).

19. Switch to the wireframe texture window now. Make sure you are in Move mode (V), and the background layer is selected. Hold down Shift and click on the texture with the left mouse button, dragging it onto the cavity texture sheet we were previously working on. By holding down Shift we make sure the whole of the texture is snapped directly onto the new one in the same place. This eliminates any guesswork in matching them up. However, it only works when both textures are the same size (**Fig.19**).

20. Hit Ctrl + I to invert the wireframe image, making the edges black and the background white. Go to the layers palette in the drop-down menu above the layers, and change the layer mode to Multiply. The white will now be invisible and only the red and black lines remain. I also recommend taking down the opacity of the layer to around 20% (**Fig.20**).

21. Click on the background layer and drag it downward onto the 'Create a new layer' icon (it looks like a page with the bottom left corner upturned). Then proceed to delete the old background layer. Now click on the Create a new layer icon and position it underneath the background copy layer by dragging and dropping (**Fig.21**).

22. Drag over both the normal map and the occlusion map, using Shift each time to snap it in place. Now fill Layer 3 that we created with a

Fig 20

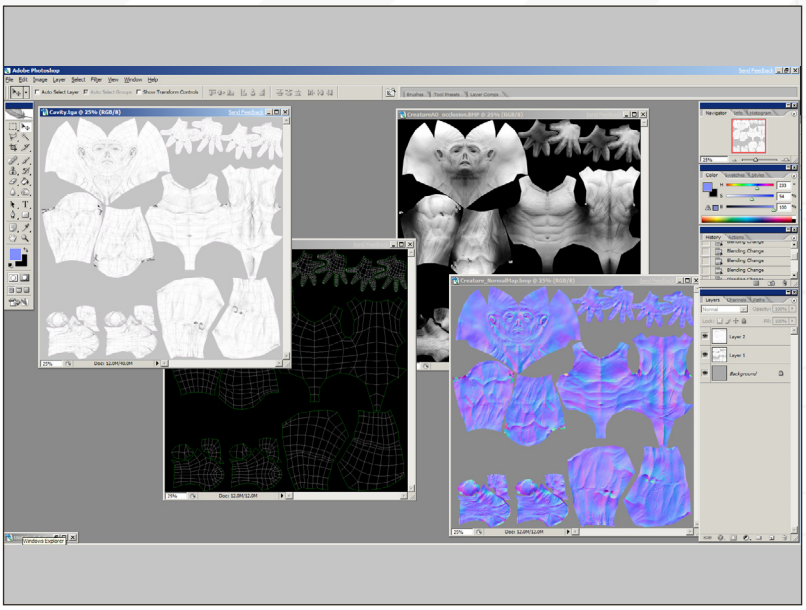


Fig 21

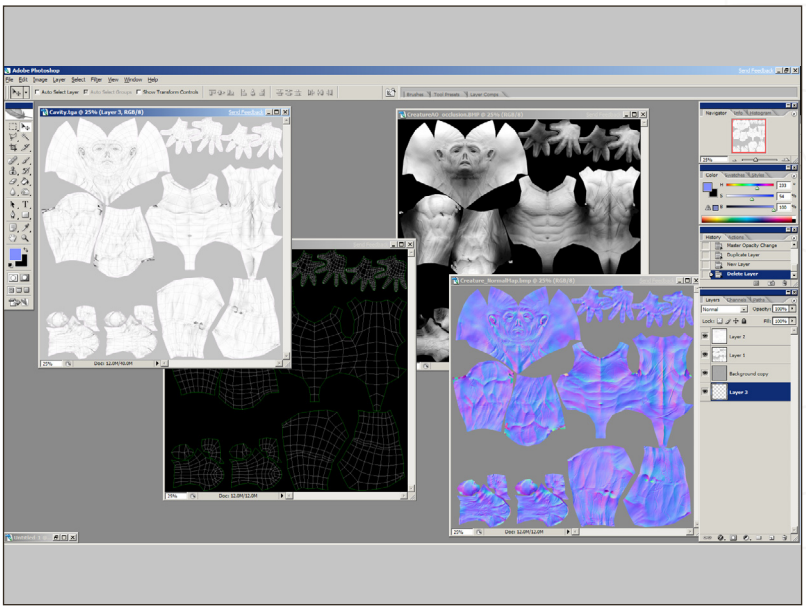
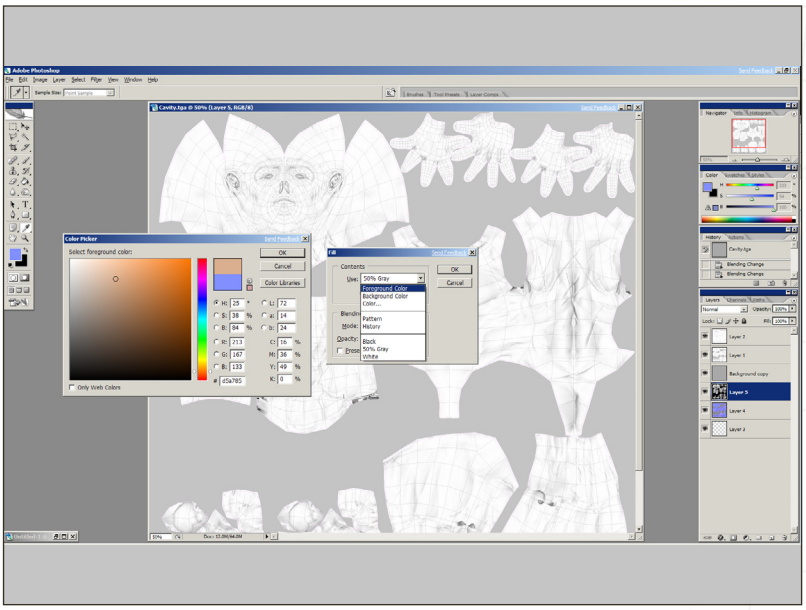


Fig 22



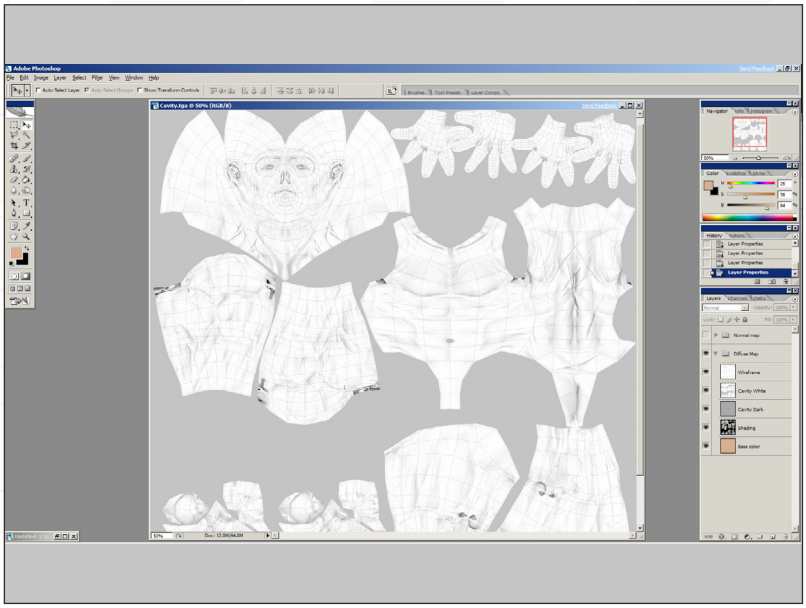


Fig 23

skin tone colour. You may pick one directly from a reference photo by using the 'I' shortcut key to access the Eyedropper tool, and then clicking on the skin somewhere. You can also select one from the colour swatches in the tool palette on the left-hand-side. Fill the layer with this colour by pressing Alt + Backspace, or using the menu Edit > Fill > Foreground Colour (**Fig.22**).

23. Now is probably a good time to give your layers appropriate names. I also take this time to create a new group for the diffuse map and the normal map ready for later. The 'Create a new group' button is next to the Create a new layer button and looks like a folder (**Fig.23**).

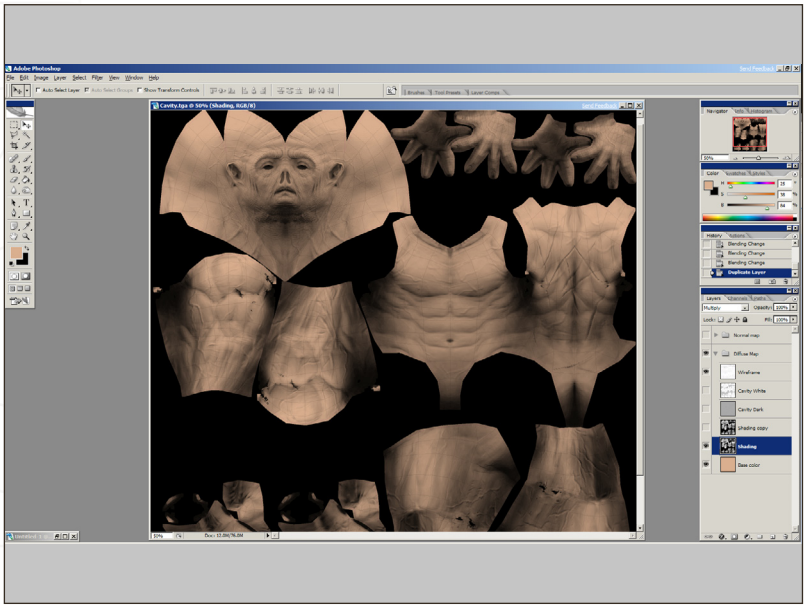


Fig 24

24. Hide both cavity layers by clicking on the eye on the left of the layer. Change the layer mode for the shading layer to Multiply. You will now see the base colour show through in the white areas of the occlusion map. We already have a map that looks quite far along in the texturing process, with all muscles and detail defined (**Fig.24**).

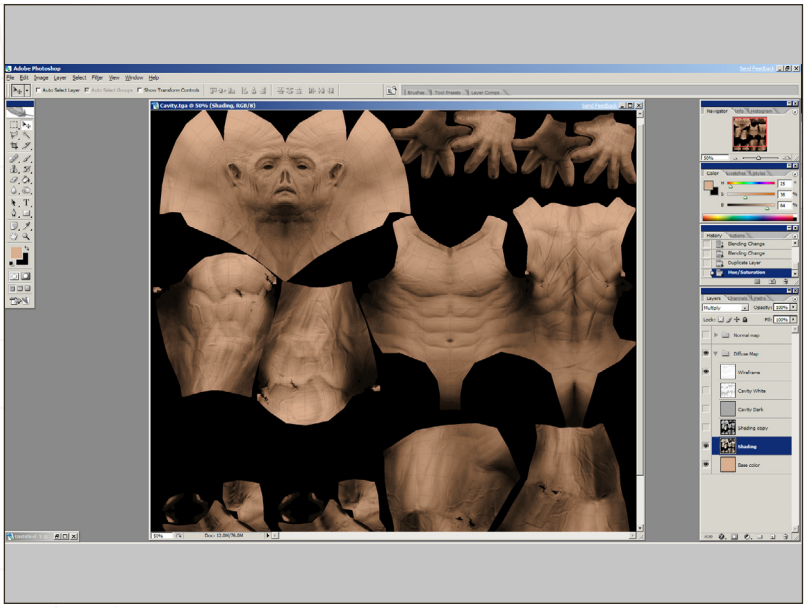
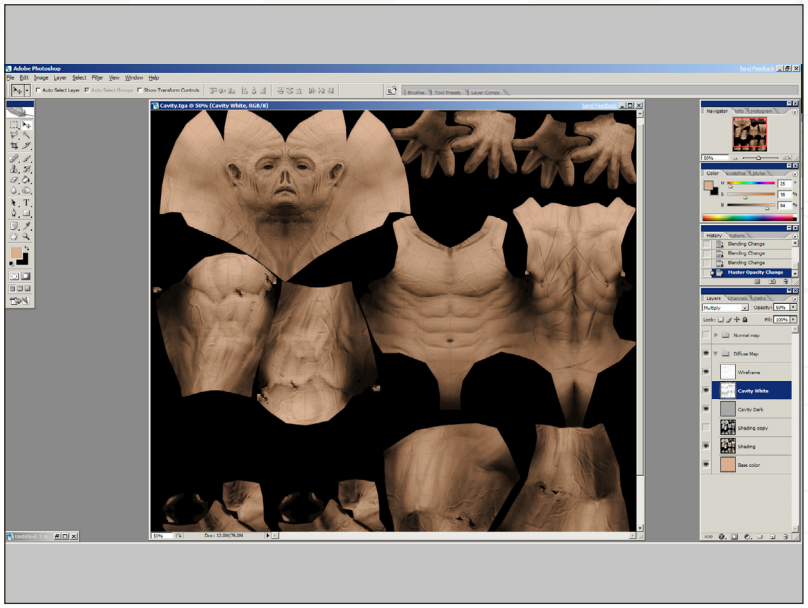


Fig 25

25. At this point I usually duplicate the shading layer and then hide the duplicate. Now select the original shading layer and go to Image > Adjustments > Hue Saturation. Click on the box labelled Colourise and tint the map a little red, since skin is not grey in areas of shadow, it actually takes on a more saturated red colour. Instantly, our texture feels more alive (**Fig.25**).

26. Change the layer mode for the cavity dark layer to Overlay and reduce the opacity to around 25%. The cavity white layer however can be set to Multiply with an opacity of 50%. It's important to know how blending modes work and what they can be used for. There are many guides online to really find out how each one works, but usually running through the drop-down list with the up and down arrow keys quickly gives you a variety of different effects from which you can pick the most fitting for the situation.

Fig 26



Our two blending modes here, Multiply and Overlay, are fairly simple (**Fig.26**):

- Multiply looks at the colour in the texture of the layers below it and multiplies it with colour in the corresponding area of the layer. Multiplying white gives no effect and effectively produces transparent areas. Black creates 100% opaque areas. Any colour painted in the multiply layer over other colours will result in a darker colour

- The Overlay blending mode works in a similar way to Multiply, but instead of white as having no effect, 50% grey is effectively transparent. Any light or dark colours painted onto the map will be screened or multiplied with the colours underneath, brightening or darkening them. The Overlay blending mode retains shadow and highlight information in the underlying colours, making it a good choice of blending mode for adding tileable detail, or in this case light and dark information from a cavity map

Fig 27

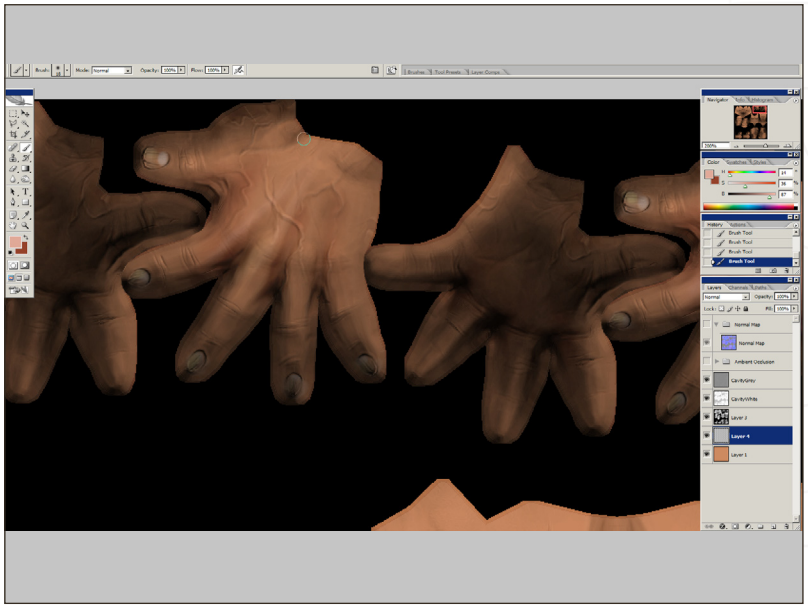
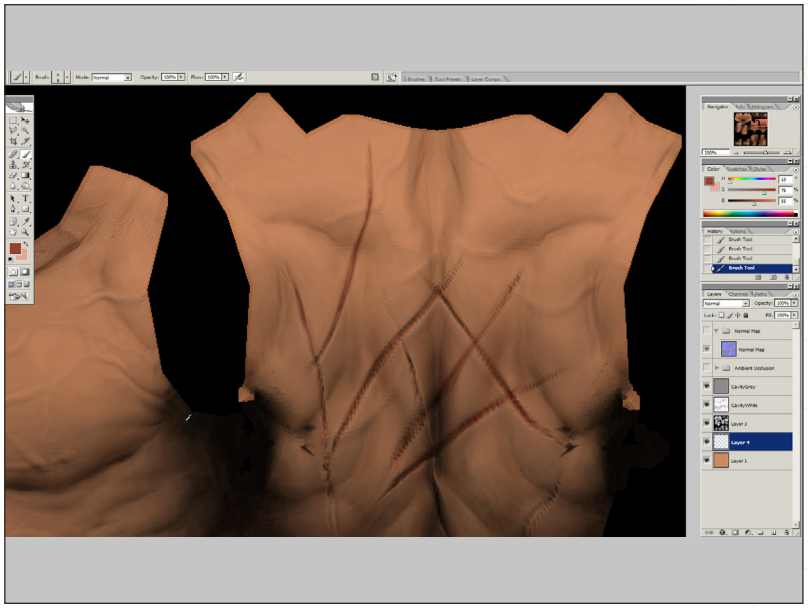


Fig 28



27. Let's move onto painting the actual texture now. Create a new layer above the base colour layer. Now, starting with the hands, choose a lighter colour than the base colour and paint over the knuckles and all protruding parts of the top side of the hands. Also paint in the fingernails at this point to differentiate their colour from the colour of the skin. You can also paint the wrinkles to give them some volume.

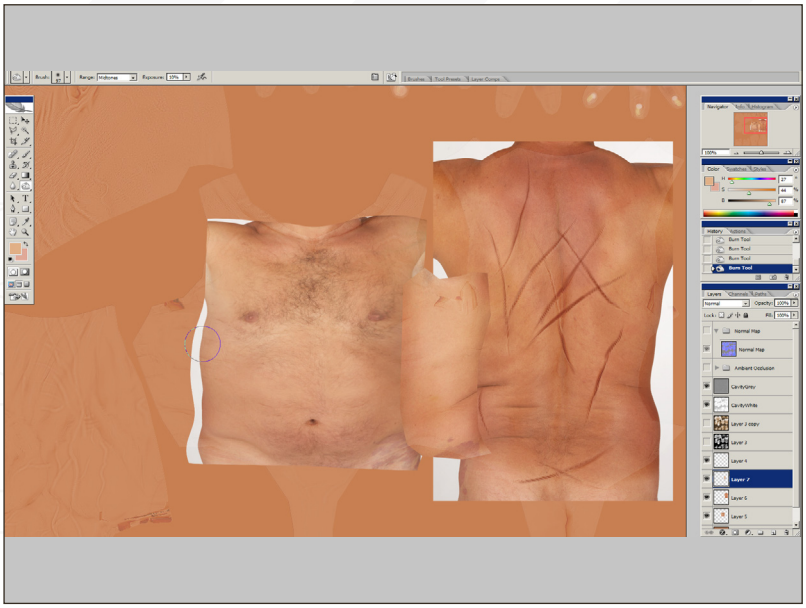


Fig 29

We don't want to be painting too much highlight and shadow information into the map as the normal map and specular maps should handle most of this job, but it's always good to add a little bit in the diffuse map just to accentuate the shading. You can also choose a darker colour at this point and paint the deeper parts (**Fig.27**).

28. Move onto the back of the character now and paint red into the large slashes on his back. Nothing too detailed, but again just to differentiate them from the skin colour (**Fig.28**).

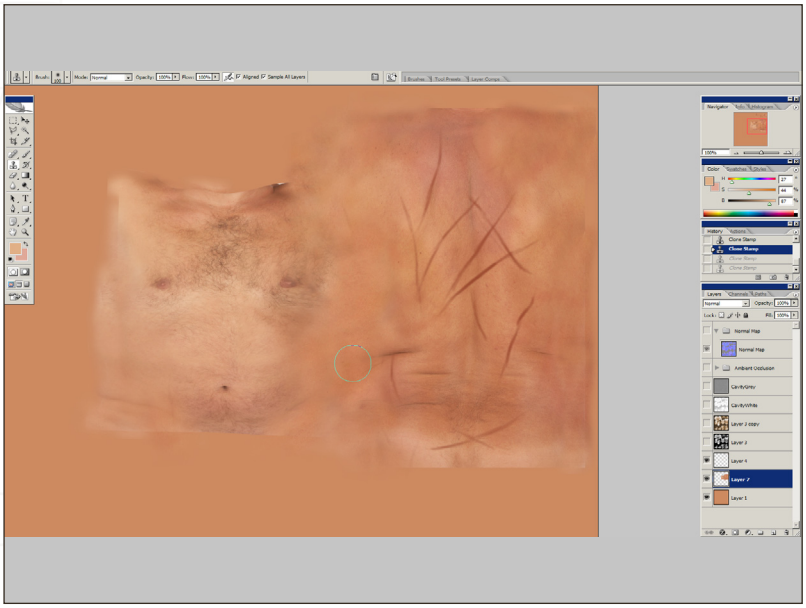


Fig 30

29. Hide the cavity and shading layers, and then import reference images of the front, back, and side of a male model. It doesn't really matter at this point if the man's skin tone or skin texture matches the concept as we will heavily edit it later. We just want a little bit of variation and colour, and to give us a base to work from. Using the Marquee Select tool (M) select the chest of the reference image and drag it onto our texture. Do the same with a section of the side and back of our character (**Fig.29**).

30. Using the Eraser tool (E), go around the outline of each reference picture erasing all of the white background and feathering the edges so they all blend in together. Once the images are roughly blended, select the top layer of the three and hit Ctrl + E twice, to merge these layers together (**Fig.30**).

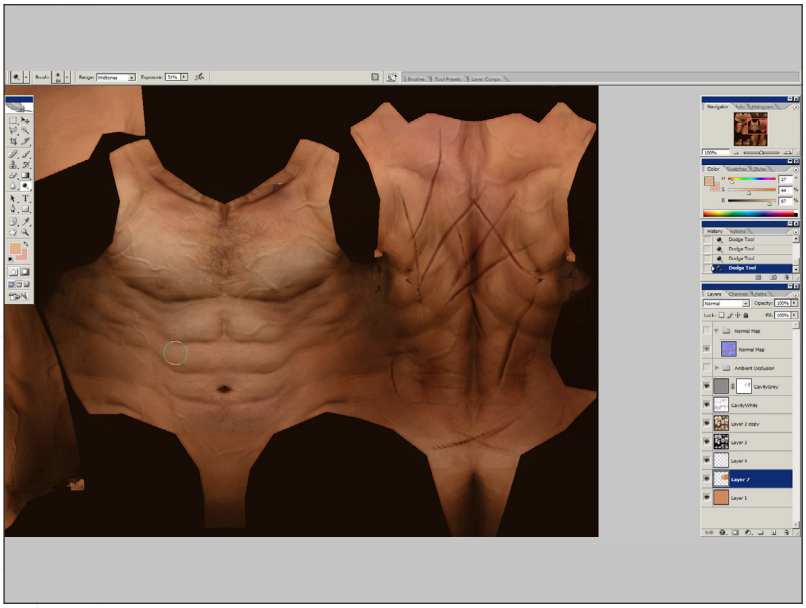
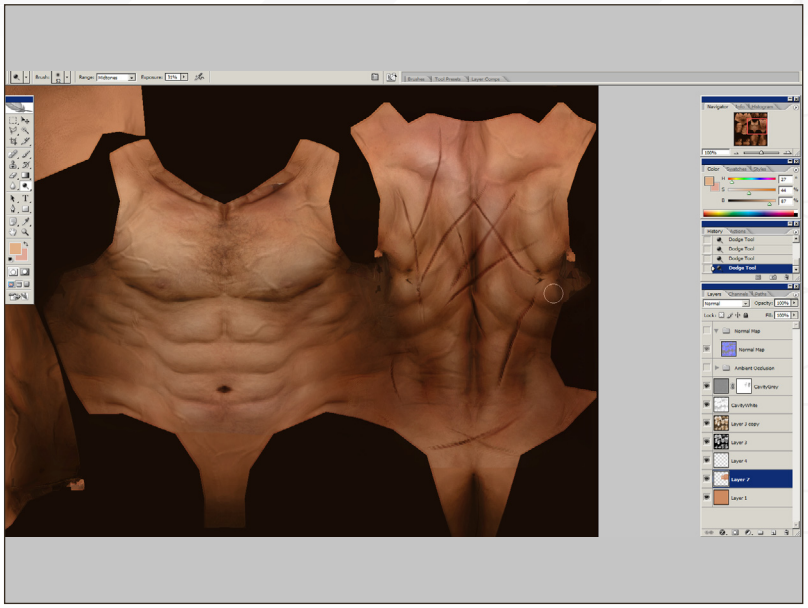


Fig 31

31. Now unhide the cavity and shading layers. We are going to work directly on the layer we just created from our reference photographs. We need to define the muscles now as we defined the hand earlier. Select the Dodge brush from the tool palette. The shortcut for Dodge and Burn is O, with SHIFT + O cycling through Dodge, Burn, and Sponge tools. When Dodge or Burn is selected, we have the option at the top of the screen to change the range. We can specify if the tool affects the midtones, shadow areas, or highlights of the image. For now, leave it on midtones. We'll use the Dodge brush to paint over areas where the muscle sticks out.

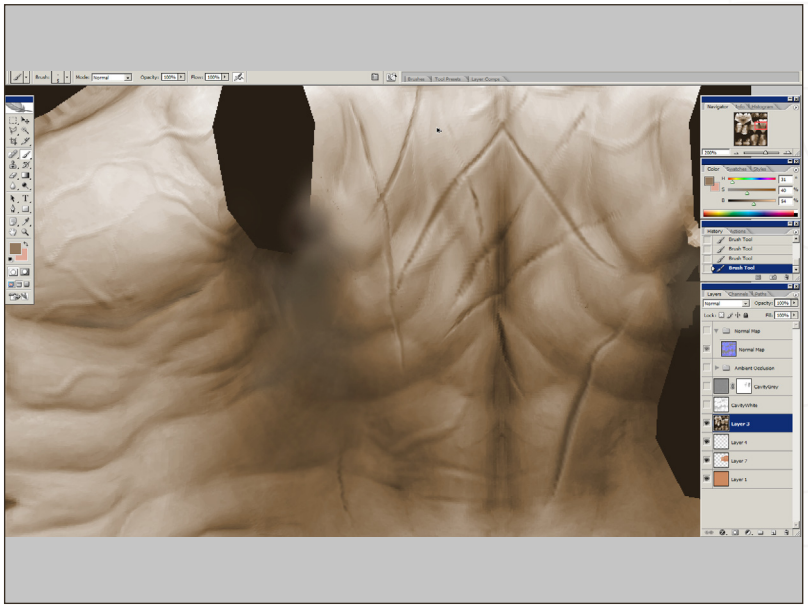
This only needs to be done lightly to hint at a 3D effect, as any more and it will look too baked (**Fig.31**).

Fig 32



32. Now work on the back of the character in the same way. You can also use the Burn tool to darken areas where muscles overlap or cast a small shadow. Again, be careful to not go too far (**Fig.32**).

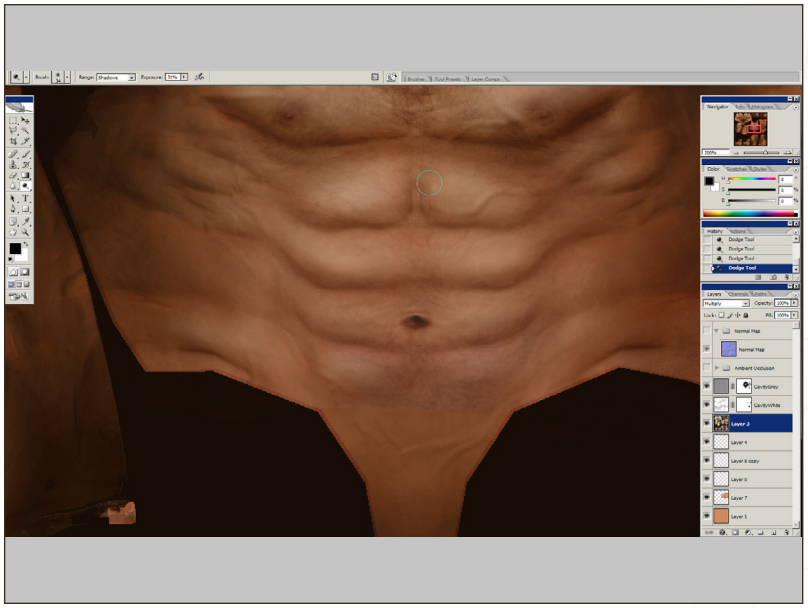
Fig 33



33. You can take this opportunity to do the same technique on the rest of the model, applying the same principles to the muscles on the legs, arms, neck, and feet.

Hide the cavity layers and change the layer blending mode of the shading layer to normal. Some areas of this shading map are too dark and we need to lighten them up and fix any intersection errors that have occurred. Switch to the shading layer so we can work directly on it now. For example, under the arm there are a few areas that don't look clean and smooth. Use a combination of the paintbrush, sampling areas of colour nearby by holding Alt + left-clicking, and the Dodge brush to lighten up darker areas (**Fig.33**).

Fig 34a



34. Switch the layer blending mode back to Multiply and turn on the cavity layers again. Work in a little more detail now with the Dodge and Burn brushes and the paintbrush, sampling areas of colour and accentuating the muscles and raised areas (**Fig.34a – 34b**).

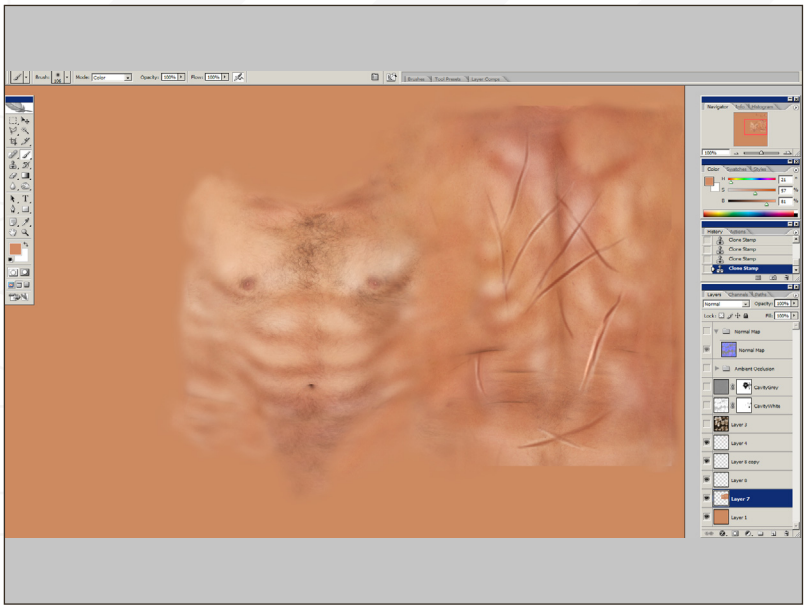


Fig 34b



Fig 35

35. Using more photo references now, find an image of a man's face that looks like it would work well for our character. He doesn't have to be ape-like; again we just need a little bit of colour variation and natural detail. Cut out just the face section and paste it directly above our photo reference layer (**Fig.35**).



Fig 36

36. Now with that layer selected, go to Filter > Liquify. This will open the Liquify tool, which is great for quickly morphing around our images to fit onto a specific shape. Using the default Liquify brush, with a brush size of around 200, move the image around to fit. You will notice that even though you're moving it around, it's still visible in its original form. At the bottom of the menu on the right, click on the drop-down menu and select the shading layer. Make sure Show Backdrop is enabled and the opacity setting is around 60 (**Fig.36**).

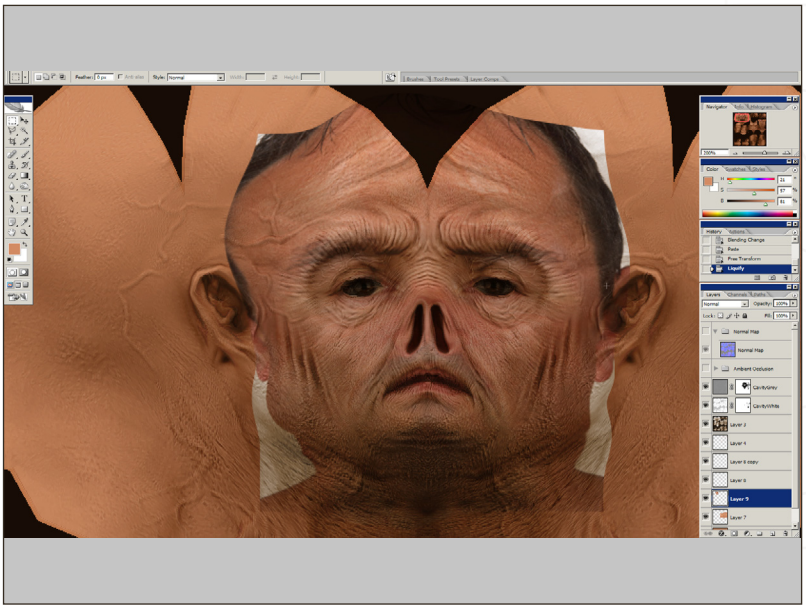
37. Now when we morph our image we will be able to morph it around directly and match it up with the underlying shading layer. Liquify the image now to fit, altering the brush size up and down when necessary (**Fig.37**).

Fig 37



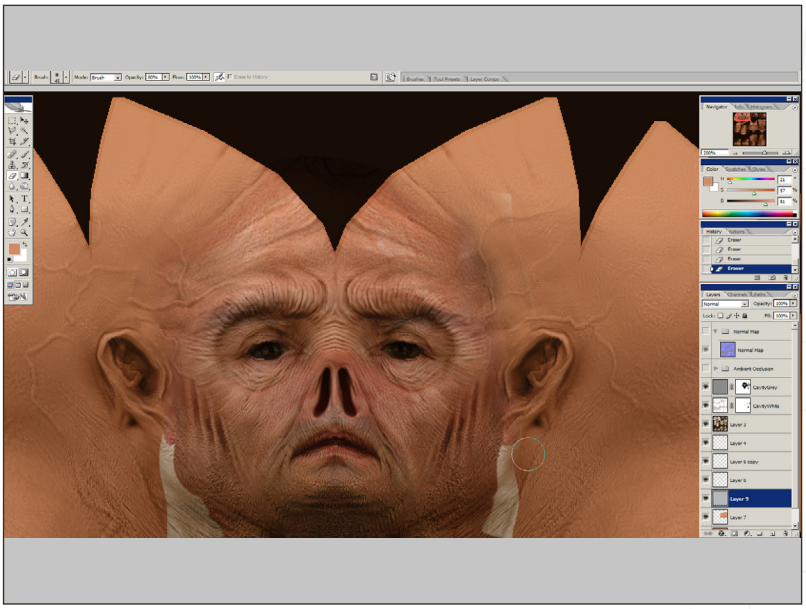
38. Commit to our Liquify by clicking OK (**Fig.38**).

Fig 38



39. Carefully use the Eraser tool to get rid of all the white space and fade the texture into the base colour (**Fig.39a – 39b**).

Fig 39a



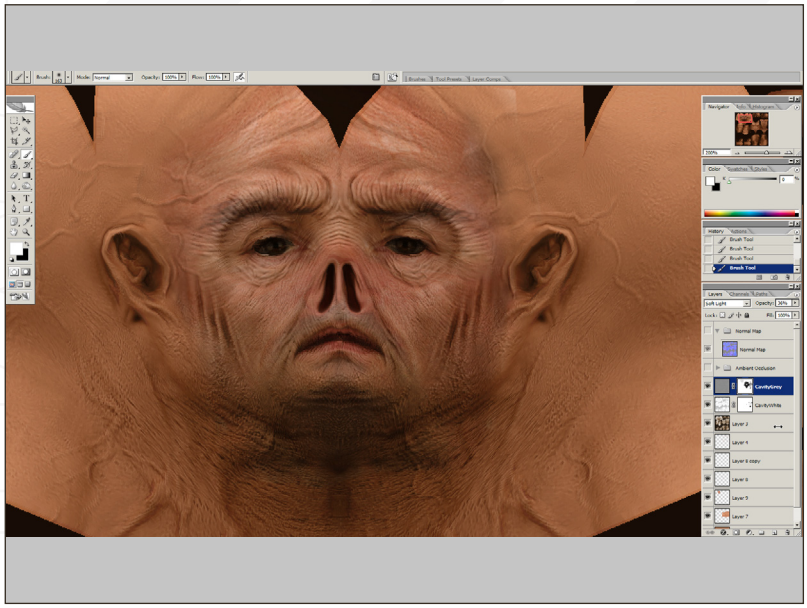


Fig 39b

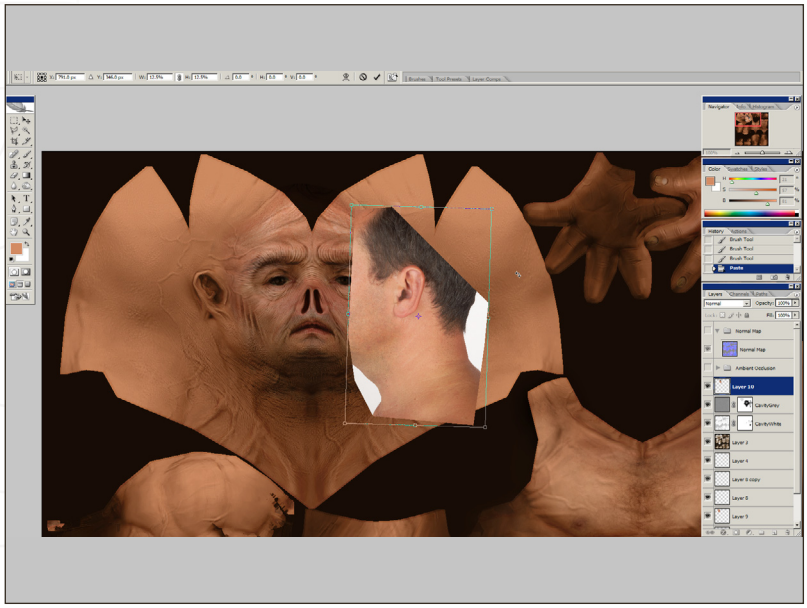


Fig 40

40. Now import pictures of the side of a man's head and paste onto a new layer. Using the Transform tools Ctrl + Alt + T, rotate and scale the image into place (**Fig.40**).

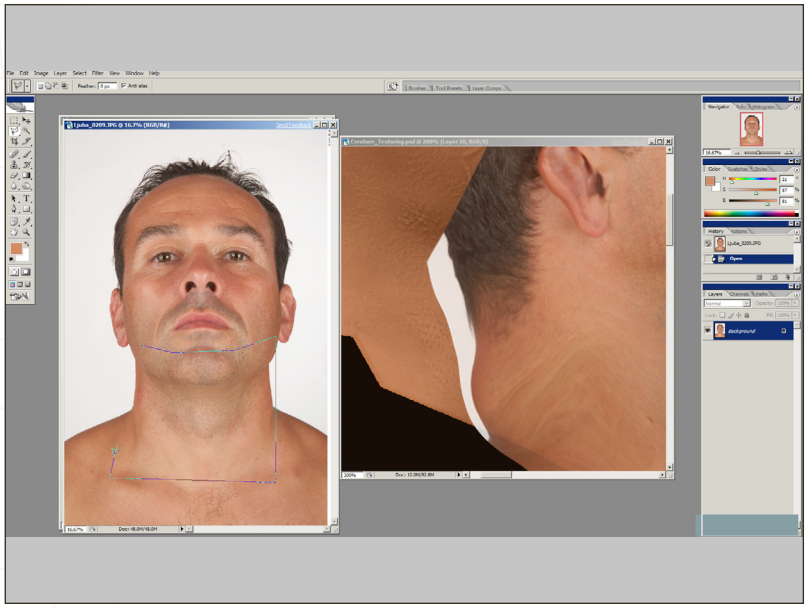


Fig 41a

41. Use the Liquify tool again to match the ear as close as possible with the shading layer. You can duplicate that layer and go to Edit > Transform > Flip Horizontal and move it over to quickly create the opposite side of the head. Now, using reference of the chin and neck, paste that in place also and use the Eraser tool to blend it with the other textures and then merge the layers together (**Fig.41a – 41c**).

Fig 41b

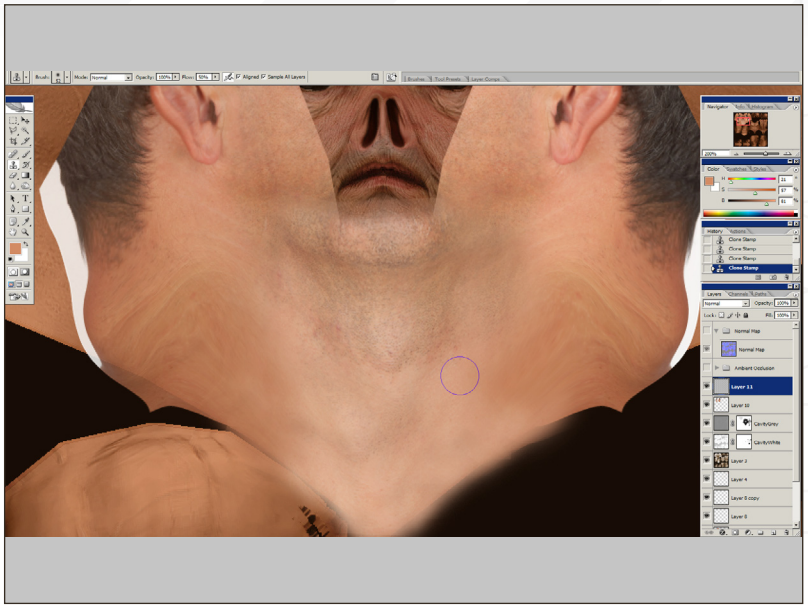
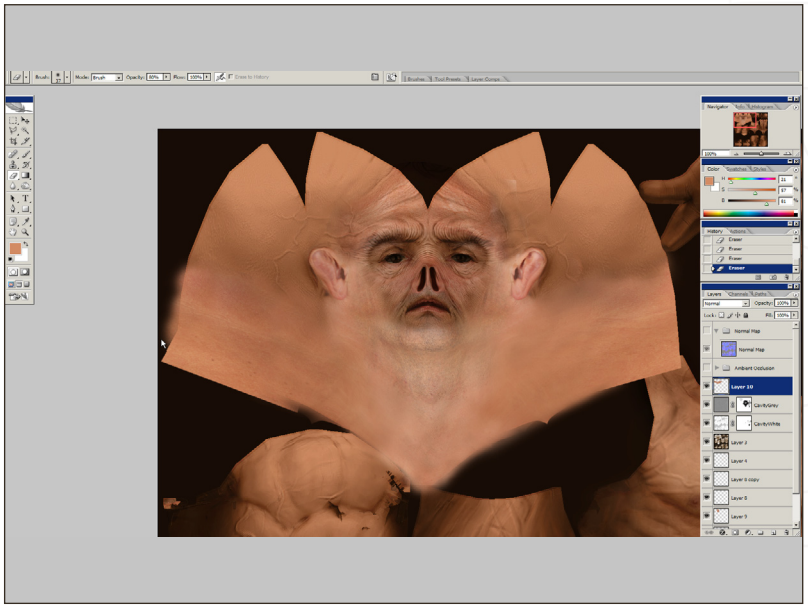


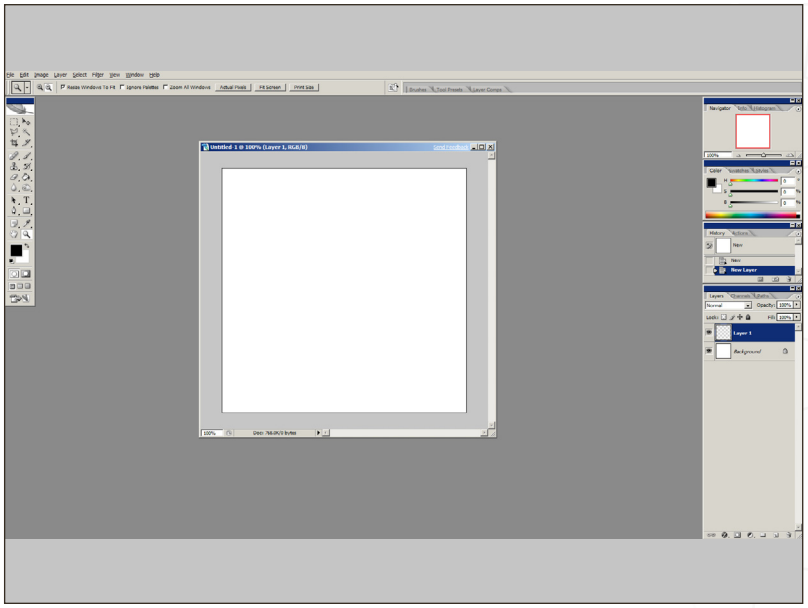
Fig 41c



42. Use the Burn tool in either midtones or highlights mode to darken the chin and neck areas and any other darker parts to reduce the contrast between the two images. Merge this layer with our other photo reference layer. Now we have a really strong base texture for the head with minimal effort. Our colour information is coming from real skin, light and dark areas of detail coming from our cavity maps, shading coming from our ambient occlusion map, tinted to look more natural, and all of this detail is supported by our normal map. What used to take days now takes mere minutes. With refinement and patience we can continue this process and turn this into a realistic, efficient texture for our character.

Let's work on painting some hair onto our character. We should first create a hair brush so we don't have to paint each hair one by one. Start a new document by going to File > New and set the dimensions to 512 by 512 pixels (**Fig.42**).

Fig 42



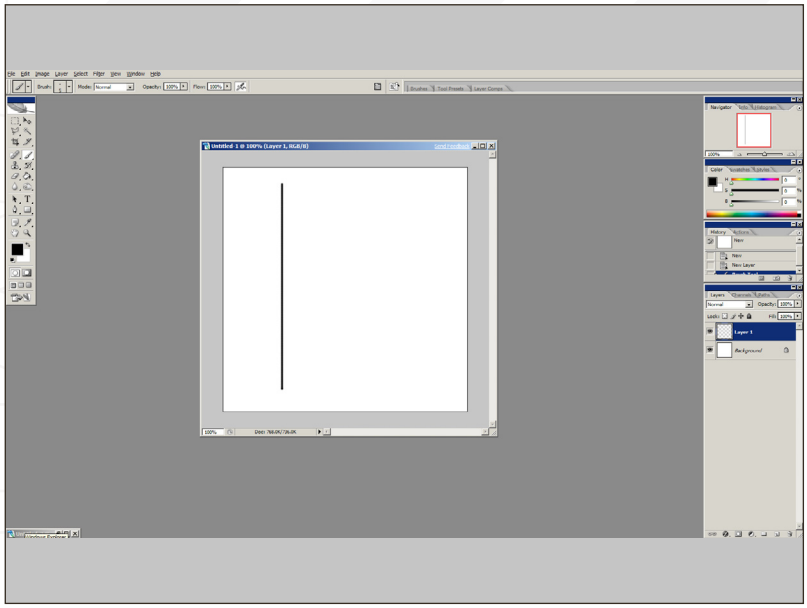


Fig 43

43. Now make a new layer and, using the paintbrush (B), draw a vertical line from near the top to near the bottom (**Fig.43**).

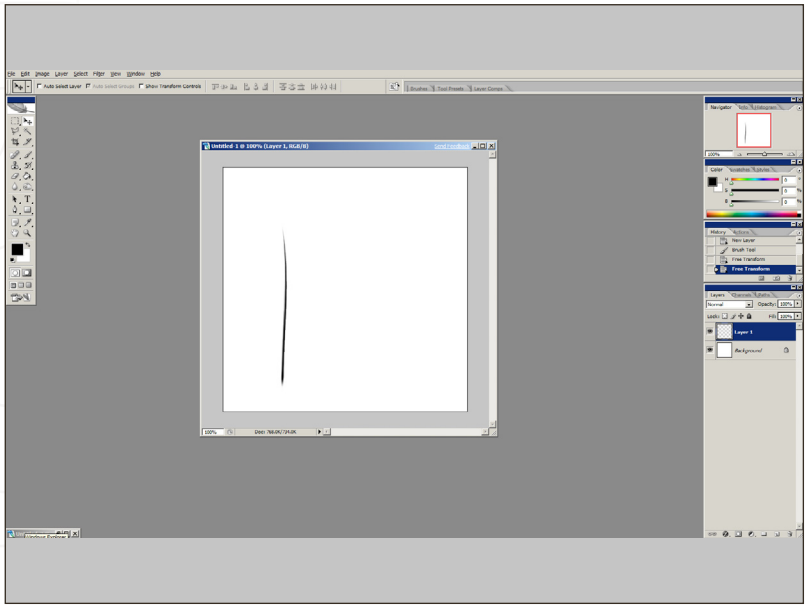


Fig 44

44. Using the Transform tool Ctrl + Alt + T, scale the top of the line inward to be just a point. Hold down Ctrl + Shift + Alt and drag one of the top left or right control points inwards.

Without exiting the Transform tool, you'll notice that the top menu bar now has controls applicable to the active tool, currently the Free Transform tool. On the right-hand-side we have a tick and a cross to either commit to the transform or to revert to how it was before. Next to this there is a button to switch to Warp mode. Warp essentially lets you bend and shape the current image using a small number of control points. Use these control points to give a little variation and bend to our line (**Fig.44**).

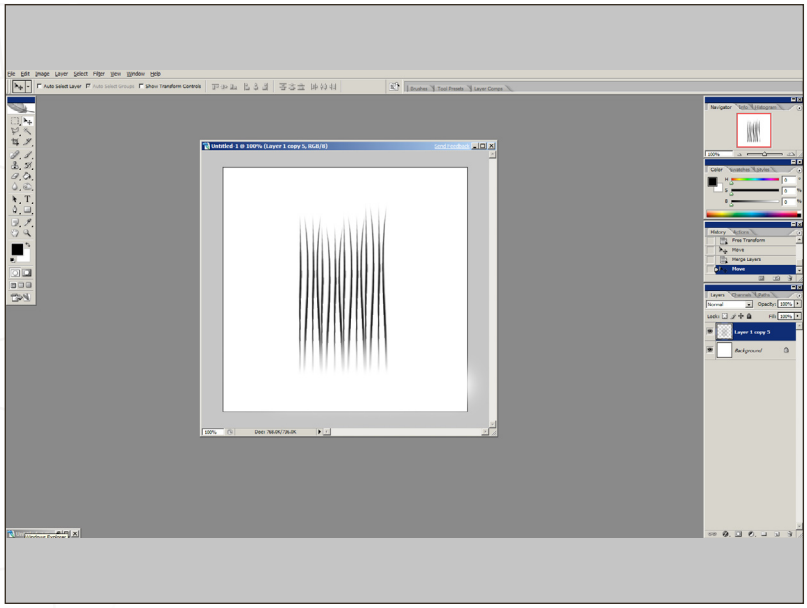
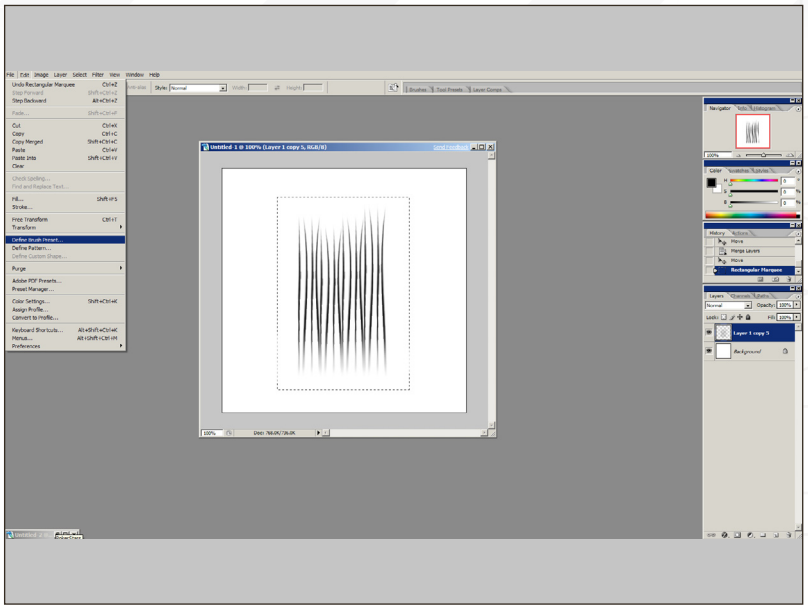


Fig 45

45. Now, using the Move tool (V), hold down Alt + Shift and drag your line to the side. Enable the Free Transform by hitting Ctrl + Alt + T and scale and warp the line slightly for further variation. Go ahead and duplicate the line in this way several times. We're looking for between 8 and 16 lines that we will use for hairs. Now, using the Eraser tool, rub out a little of the bottom section of hair so there are no hard lines (**Fig.45**).

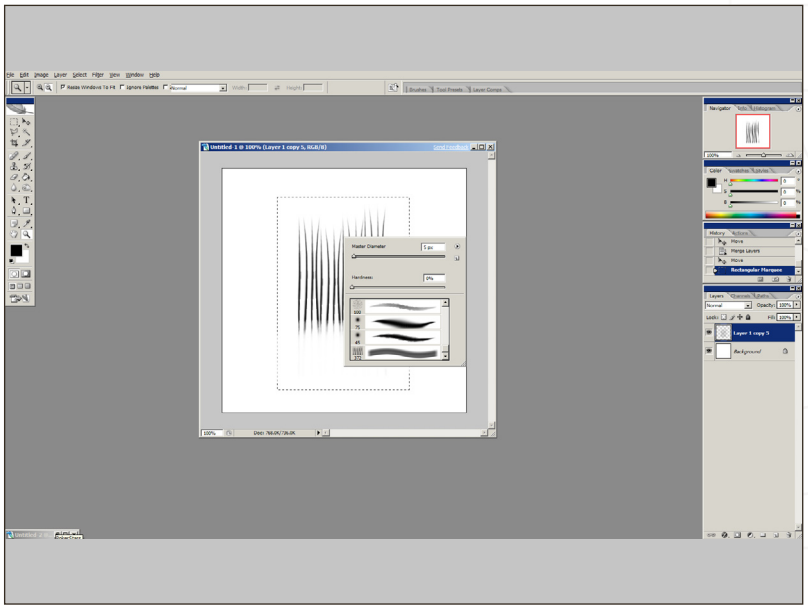
46. Drag a Rectangular Marquee around the hair and go to Edit > Define Brush Preset. Make sure the layer you create your brush on has either a white or transparent background. That way, when we later paint our hair, we will be painting unique hairs onto the layer and therefore be able to extract an alpha channel which we can use for opacity in our 3D application to make the hair look realistic (**Fig.46**).

Fig 46



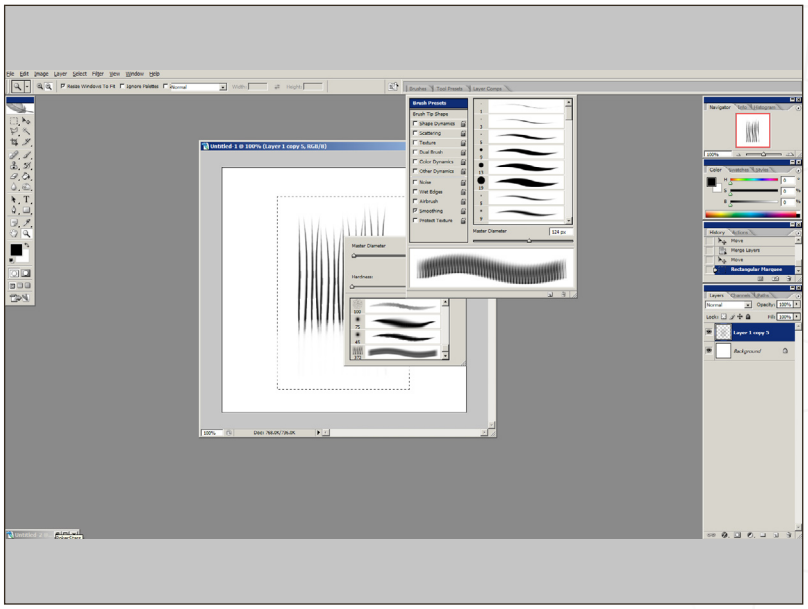
47. Commit to the brush preset and then right-click over your image. Scroll down the menu until you get to the very last brush, which will be the one we just created (**Fig.47**).

Fig 47



48. In the upper right of the screen there's a brush menu where we will edit the brush settings (**Fig.48**).

Fig 48



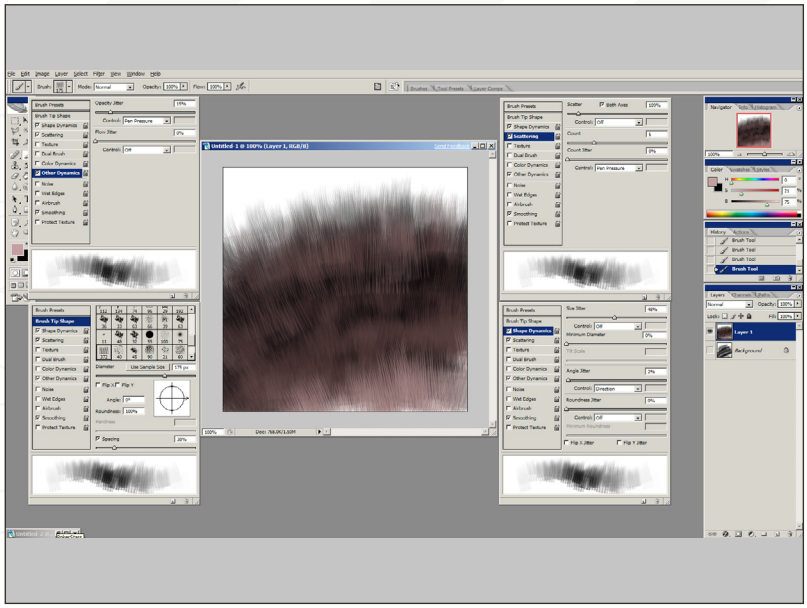


Fig 49

49. It is important here to make sure the brush has an organic feel to it by varying the opacity, size and angles. Copy the brush settings in the screenshot and try out your brush on the canvas. Important settings are under Shape Dynamics > Angle Jitter. We can change the Control to Direction so we have more control over how our hair is spread on the character. Optionally, we can also use the Colour Dynamics to add variation in the hue and saturation, which will help immensely in quickly creating unique, natural, and believable results. We will also use Scattering to add multiple brushstrokes at once to build up hair much more quickly (**Fig.49**).

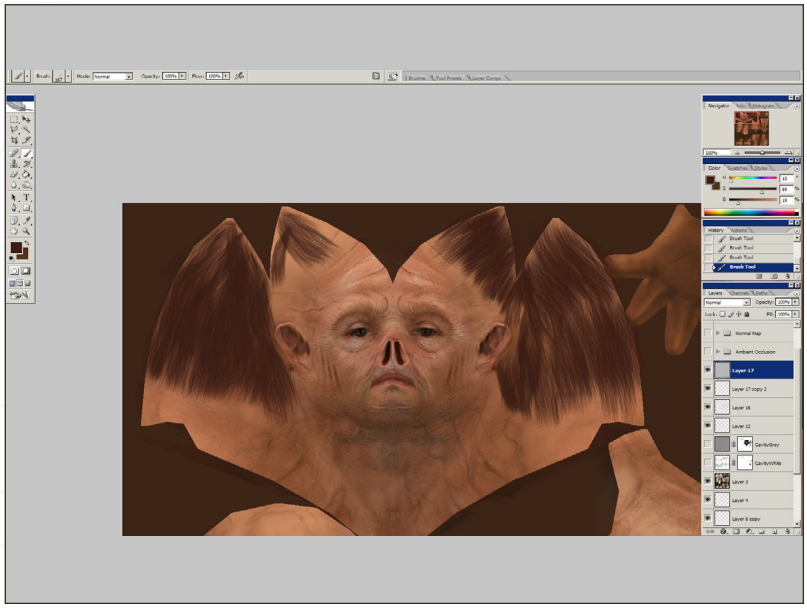


Fig 50a

50. The brush that we just created can be very useful for creating short animal fur. Try creating some new brushes in the same way but with a longer sample of hair, or with wispy, curly strands.

On a new layer, use the hair brush to paint basic hair onto the head of our character. Use a dark colour to simulate shadow, and as we paint more on top we will get lighter in our colour choices to give the hair depth. We will supplement this later with opacity-mapped hair planes to make the hair more 3-dimensional (**Fig.50a – 50b**).

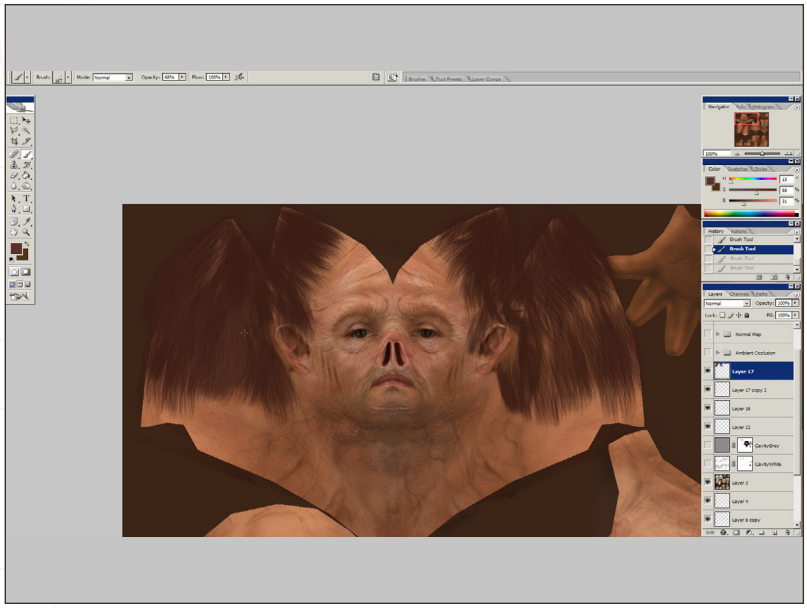
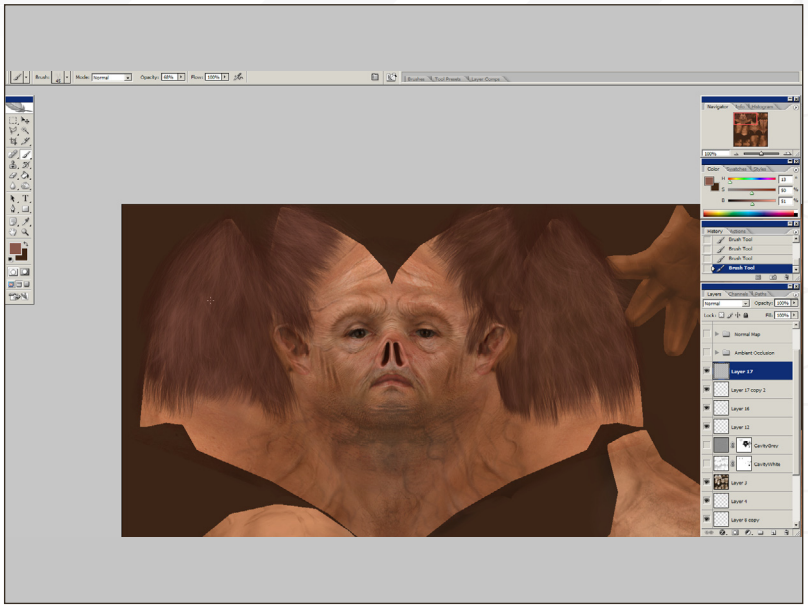


Fig 50b

51. Now add a lighter colour on top and start to paint wispy hairs. Using the Burn tool, darken the whole hair layer a little bit (**Fig.51**).

Fig 51



52. Moving on to the rest of the body, create new hair brushes that are composed of smaller, thinner hairs and make sure the scattering and spacing allow for a much lower density of hair placement.

Paint hair on the tops of the hands, palms, chest, back, arms, and legs. This kind of hair is thinner and wispier than the head and leg fur, and should remain quite light, darkening in areas where it would be thicker such as underneath the armpits and in the centre of the chest (**Fig.52a – 52b**).

Fig 52a

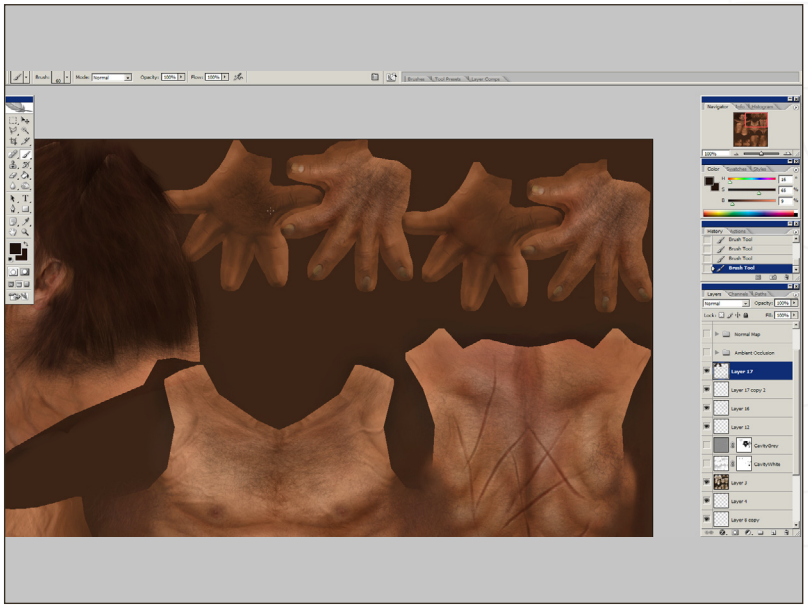
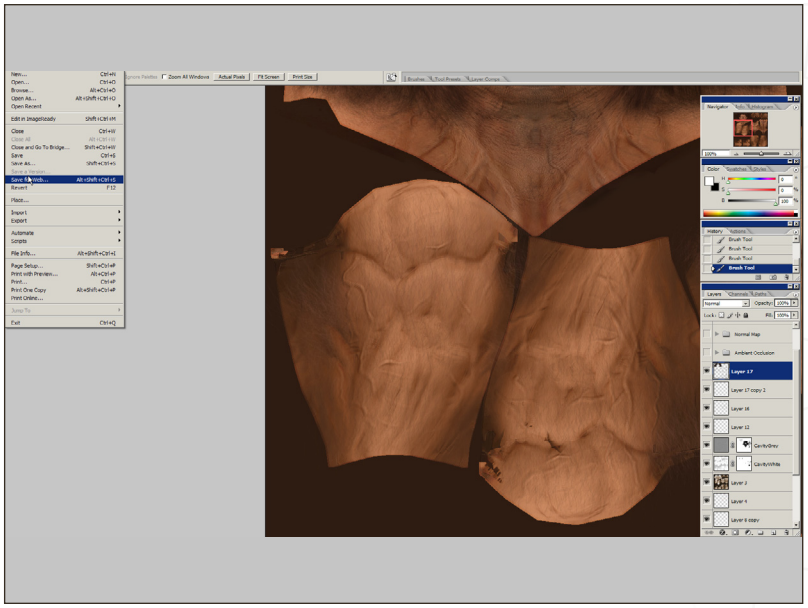


Fig 52b



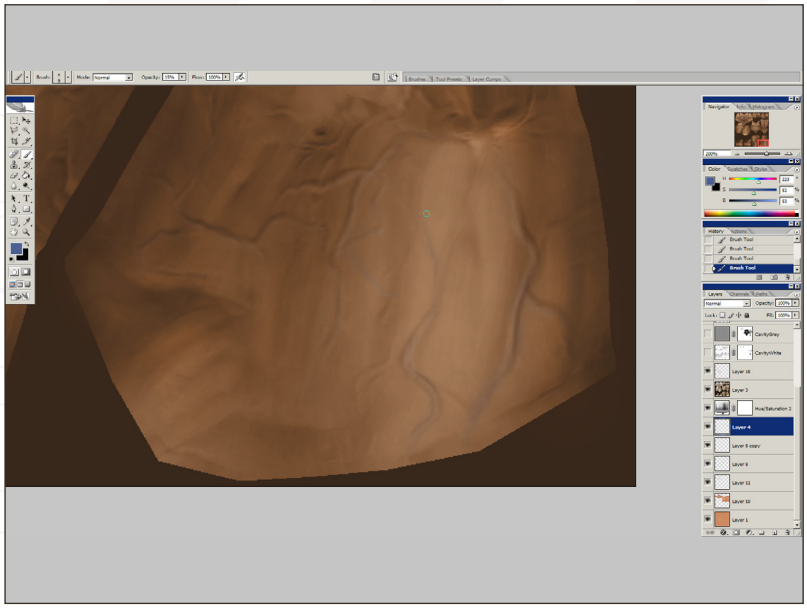


Fig 53

53. You can even create a brush of large curls that add to the underarms and crotch area to depict thicker hair. On a new layer below the shading layer, pick a bluish purple colour from the colour swatches and lightly paint over the veins in the body. The blue colour simulates a little depth to the veins, even though they are sticking out of our model in the normal map (**Fig.53**).

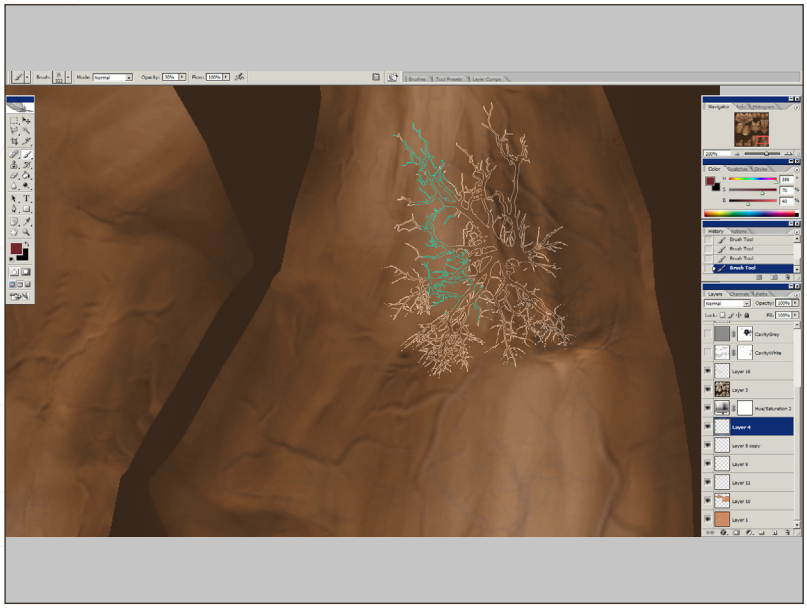


Fig 54

54. Search online or create your own brushes that look like veins. There are plenty of vein brush collections for Photoshop online. You could paint your own, or create them from photographs (**Fig.54**).

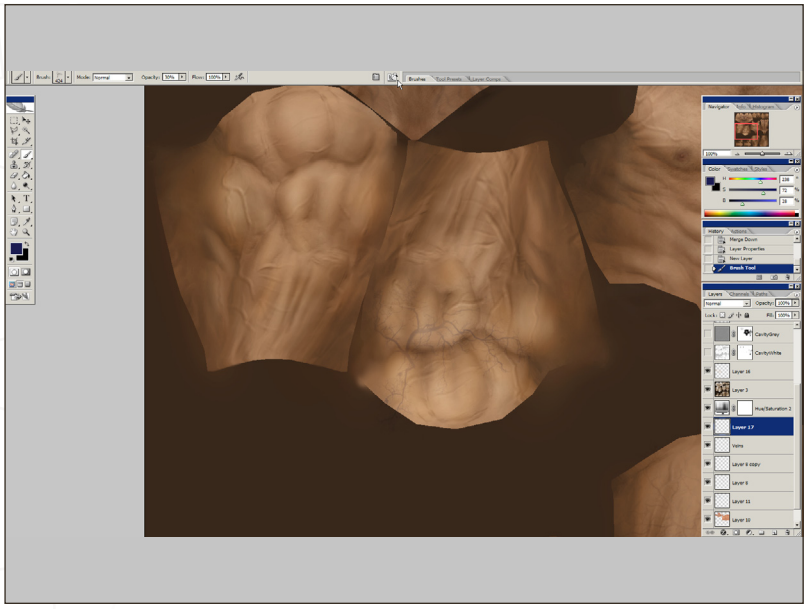
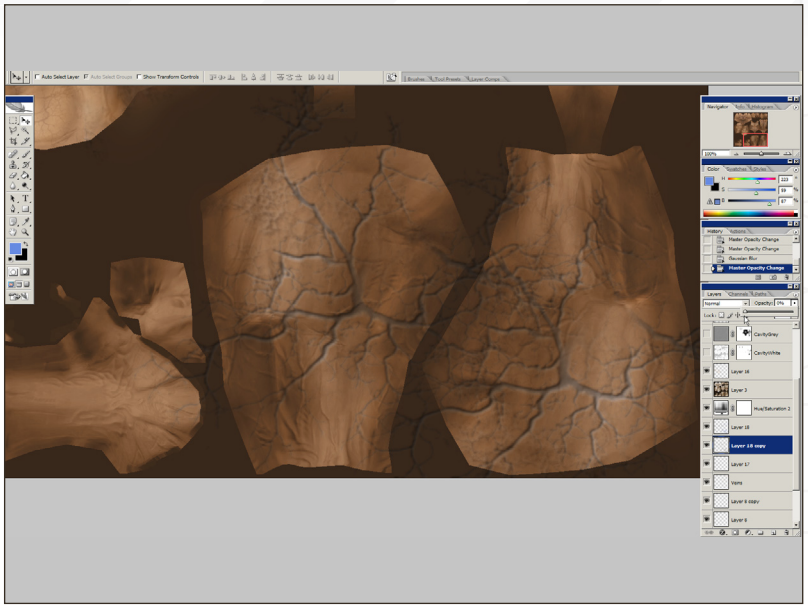


Fig 55

55. Apply this to the whole texture, creating veins wherever you feel the texture could use them. You can create mostly blue veins, but smaller red ones can offer variation (**Fig.55**).

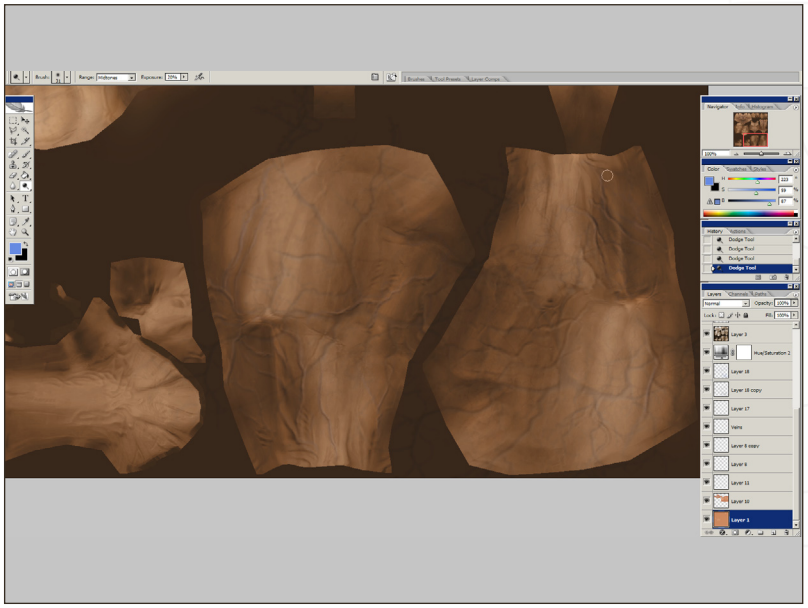
56. For some large veins on the arm, we can simulate depth by using the Emboss effect. Draw or use a brush to create a new vein on a new layer, and then go to Filter > Stylise > Emboss. Change the angle to 90 for top-down lighting, put the height around 10, and change the amount to 100 (**Fig.56**).

Fig 56



57. Now go to Filter > Blur > Gaussian Blur and give it a small value, enough to look like the example in the screenshot. Veins under the skin will not be sharp and pronounced, so the Gaussian Blur helps to set them under the surface. Reduce the layer opacity considerably to a value of between 5 and 8 (**Fig.57**).

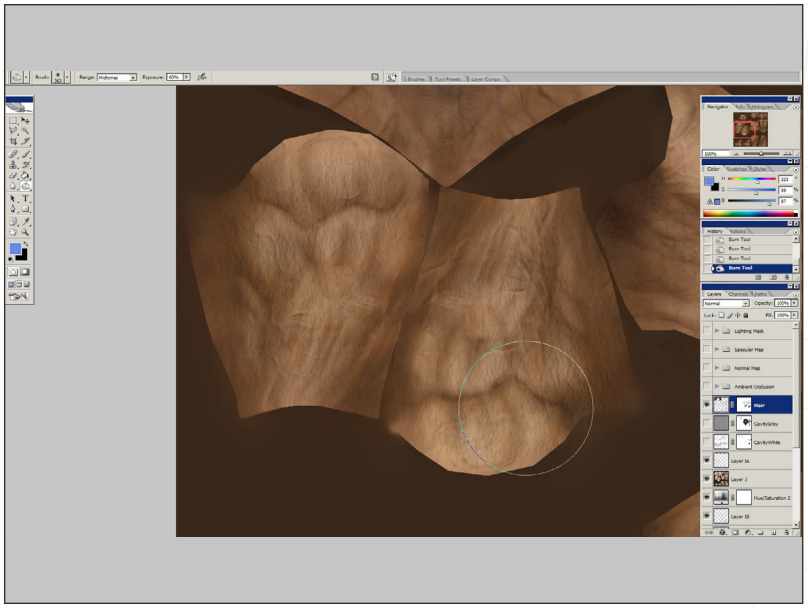
Fig 57



58. Try to keep things like hair, veins, fur, and scars on separate layers. There's always the possibility that you come into work the next day and the character has changed to a hairless lizard man. It's no good if you've baked all of your veins, hair, and fur into the base texture, as this will simply result in a complete redo of all of your work. Art directors change their minds a lot and we have to be ready for that, so working in a non-destructive way pre-empts any possible changes. It also allows us to show different variations of the character – with and without fur, hairy or smooth, with lizard-like or human-like skin, and with different colour tones. Whenever possible, try to work in a non-destructive manner.

Find the layer that you painted the arm hair onto, and darken it using the Burn tool. The arms on our character are a lot hairier than the chest and back. The forearms will be completely covered in hair by the end, so we need to suggest that in the upper arms before we paint the fur on the lower arms (**Fig.58**).

Fig 58



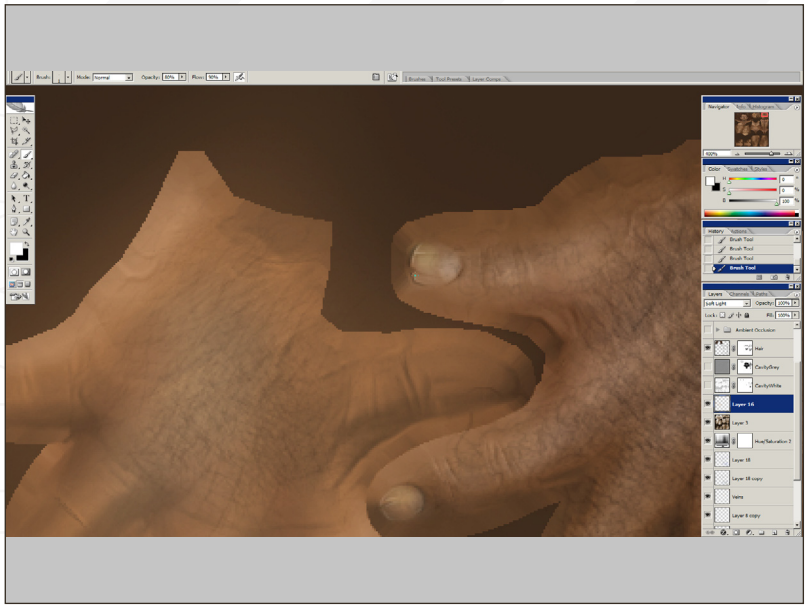


Fig 59

59. At this point take a small, light brush and paint in some small highlights where they would be on the model, for example on the edges of the fingernails and under the eyes (**Fig.59**).

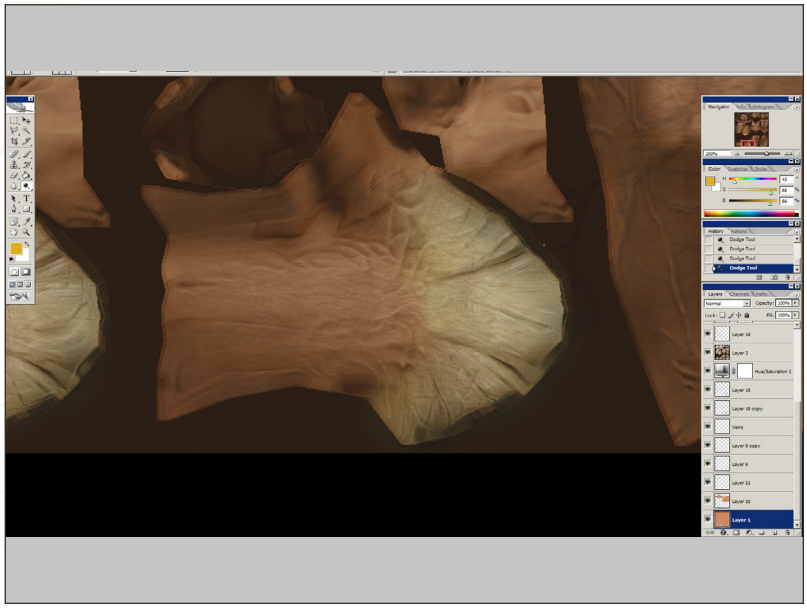


Fig 60

60. Move onto the feet now and in the base colour paint a yellowish green for the hooves of the feet (**Fig.60**).

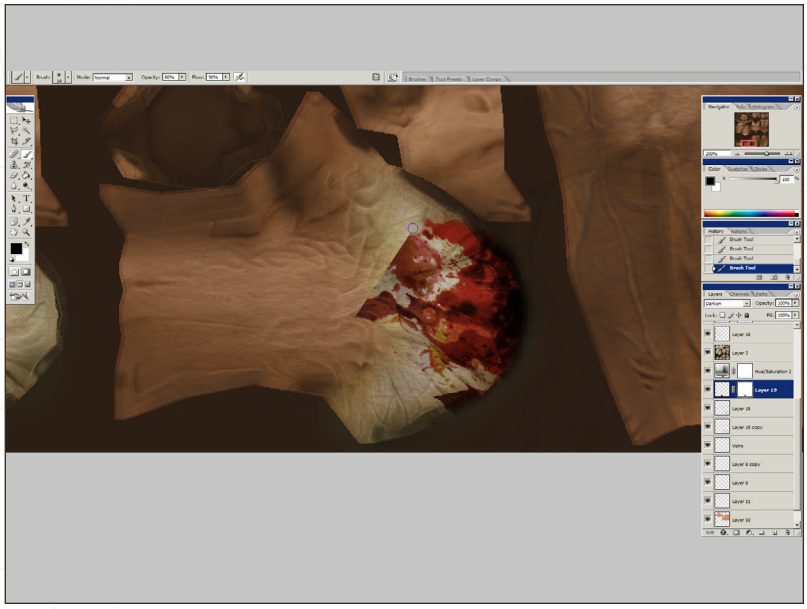
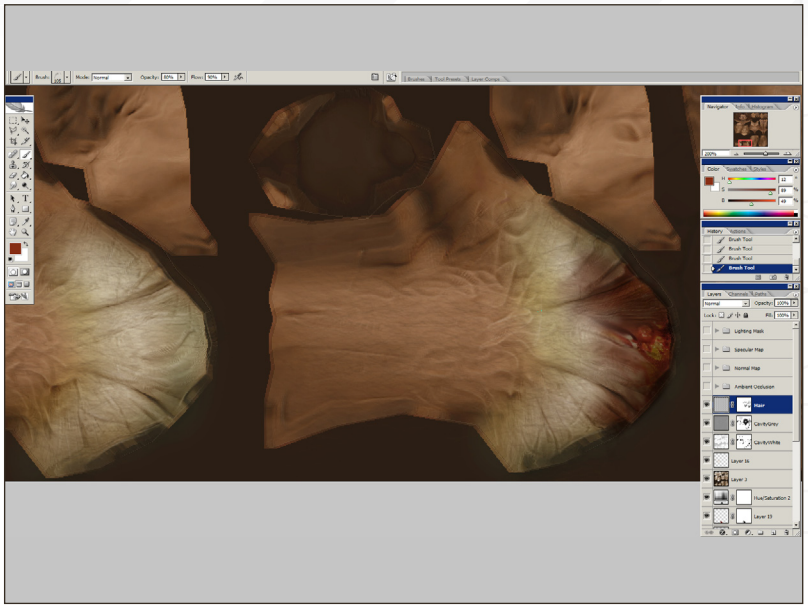


Fig 61

61. Find a picture of a blood splatter, paste it into the texture and set the layer mode to Darken. Erase any parts that might not fit and position it at the end of the foot. I want to add a little back story to the character, suggesting that in his escape he might have tripped and caught his foot on something or injured it somehow (**Fig.61**).

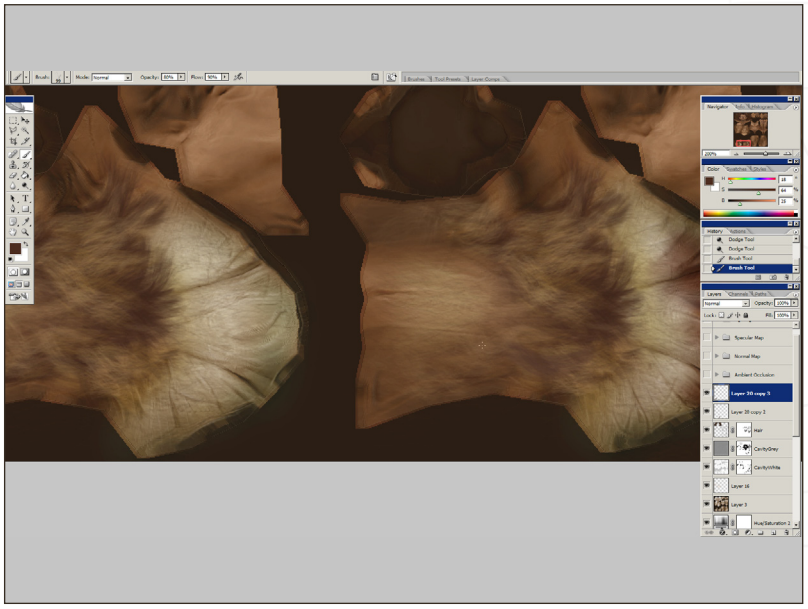
62. Position it correctly and blur around the sides of the blood splatter to make it look like the blood has soaked into the hoof, leaving one section looking like an open wound (**Fig.62**).

Fig 62



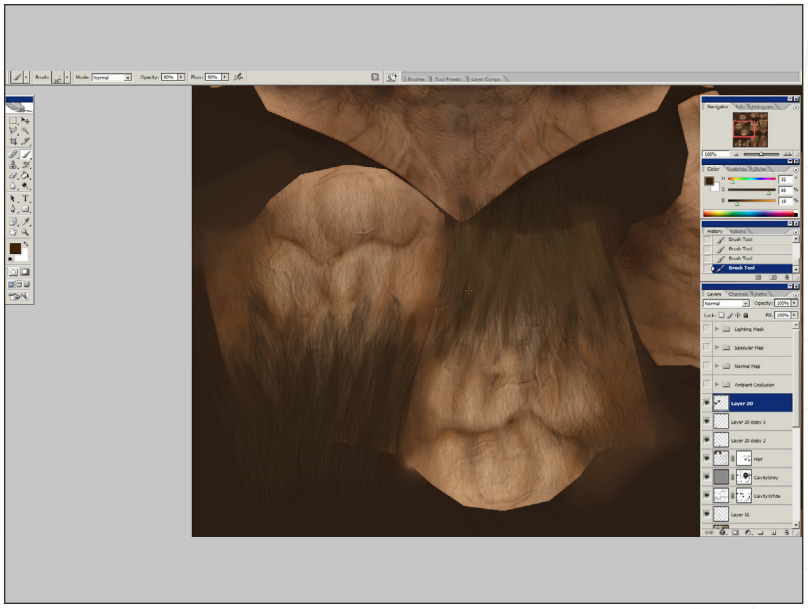
63. Staying with the feet, use the hair brushes we created to paint fur surrounding the transition between the shin and the hoof (**Fig.63**).

Fig 63



64. Paint hair in the same way on the forearms now (**Fig.64**).

Fig 64



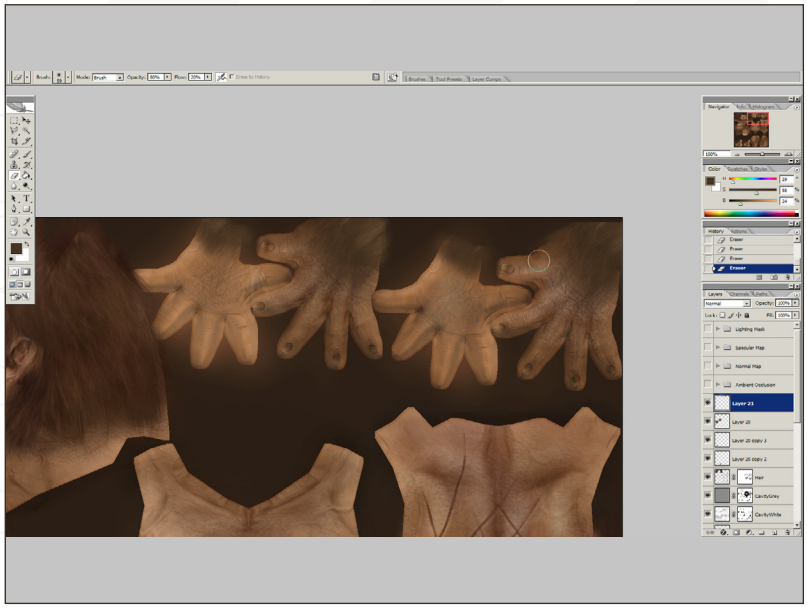


Fig 65

65. Remembering that the forearms join with the wrist, paint hair onto the front and back side of the hands near the wrist, so we can make sure that they match up (**Fig.65**).

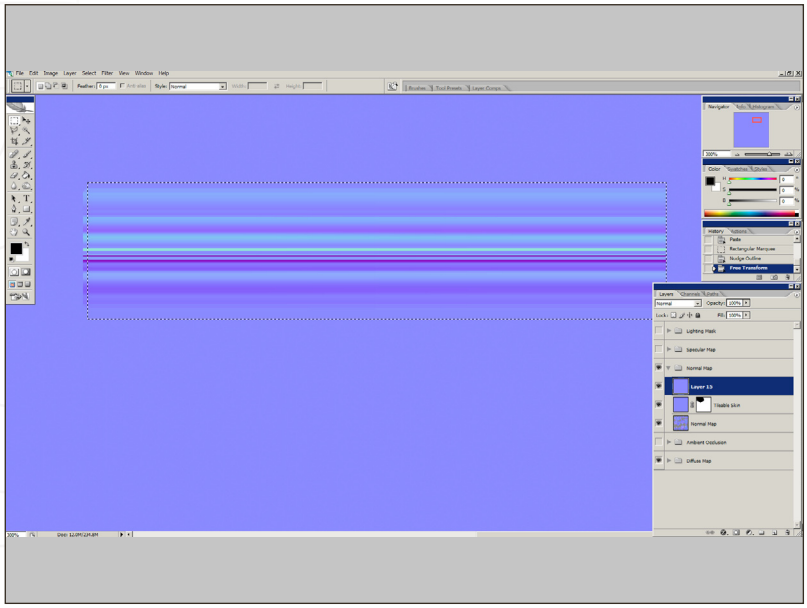


Fig 66

66. I've imported the normal map from the neck brace and dragged it onto our normal map section in place (**Fig.66**).

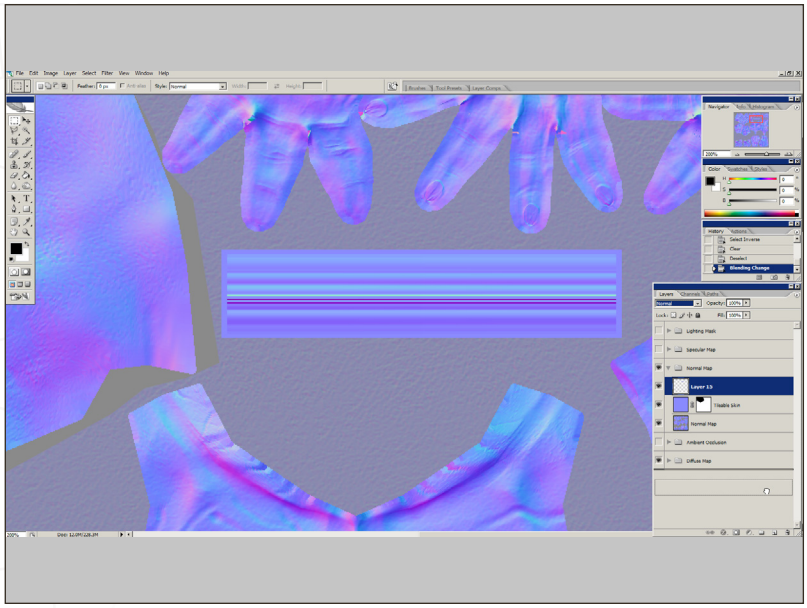
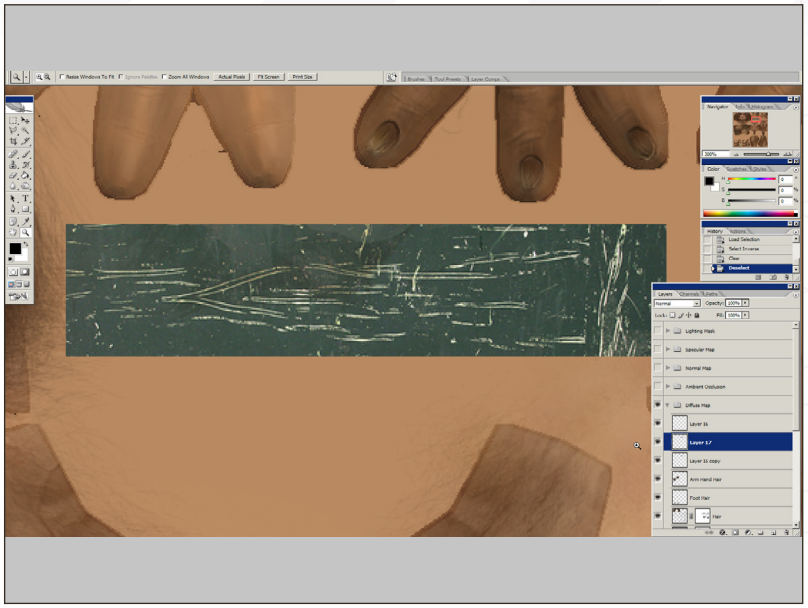


Fig 67

67. Make a Rectangular Marquee selection around the object, invert the selection by hitting Ctrl + Alt + I, and then hit Delete to get rid of the excess texture. Duplicate the layer with the normal map of the neck brace and move it into the diffuse map. Desaturate this image by hitting Ctrl + Alt + U. Now darken it by going to Image > Adjust Brightness Contrast (**Fig.67**).

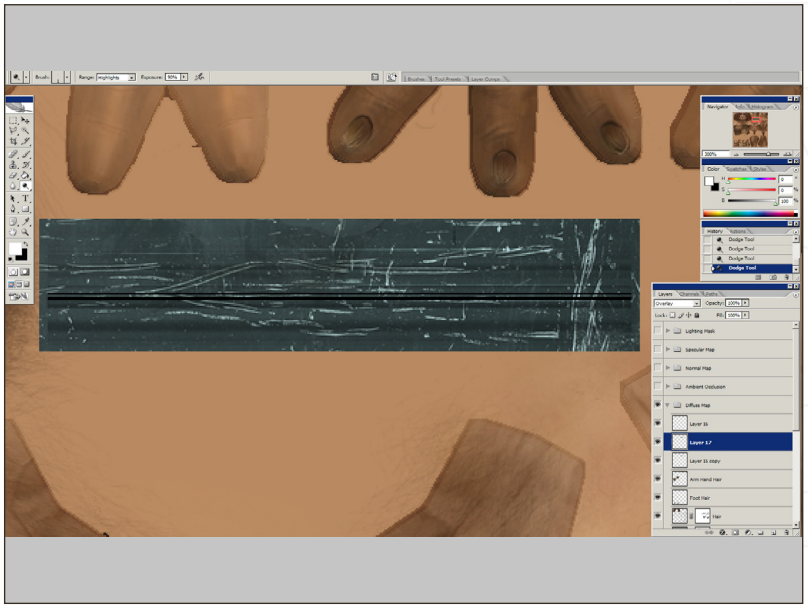
68. Back in the diffuse map, in the same area import an image that looks like metal scratches. I found this one at CGTextures.com, a free and expansive texture library that has almost any texture you could think of available. Again, make a Rectangular Marquee selection around the area, invert it, and delete it to cut away the excess (**Fig.68a – 68b**).

Fig 68a



69. Let's move on to creating a tileable skin texture that we can overlay onto our normal map. Set the layer mode to Overlay. The normal map is very smooth in areas like the chest, back, and arms and we need to give those parts some detail. A good way to do that is to take the specular map and turn it into a normal map. With a low opacity this can yield some good results, but it's not perfect, as the normal map can have a single depth look and appear too pasted on. Another alternative is to use a tileable texture, either in the normal map directly or in the shader.

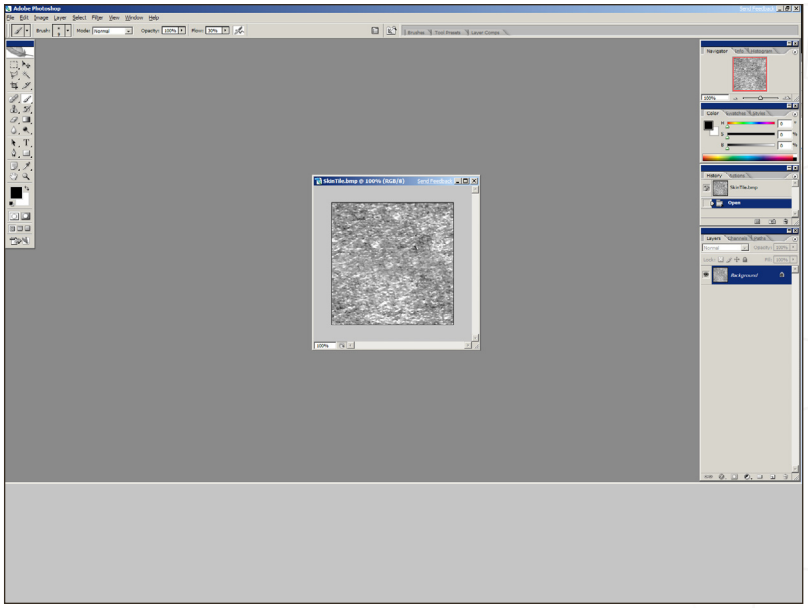
Fig 68b



To create a tileable normal map, we start off with a greyscale image of skin. You can get this from anywhere you like or paint it yourself. There are many good sources that can be used for skin images, such as oranges, elephants, rhinos or our own bodies.

Create a new document with the height and width of 256 by 256 pixels and fill it with a section of skin from your chosen reference material. Remove the colour information by hitting Ctrl + Alt + U. This is a normal map that we're creating so it needs to be created from a greyscale map, which essentially works as a height map. As this is going to be tiled across the body we have to make sure that when we do tile it there are no visible seams (**Fig.69**).

Fig 69



70. To do this, go to the Filter menu and under Other, select Offset. Type in a value of 128 into the horizontal box, and 128 into the vertical box, and then click OK. After we've applied the offset our texture will now be shifted 128 pixels to the right and 128 pixels down. We need to make

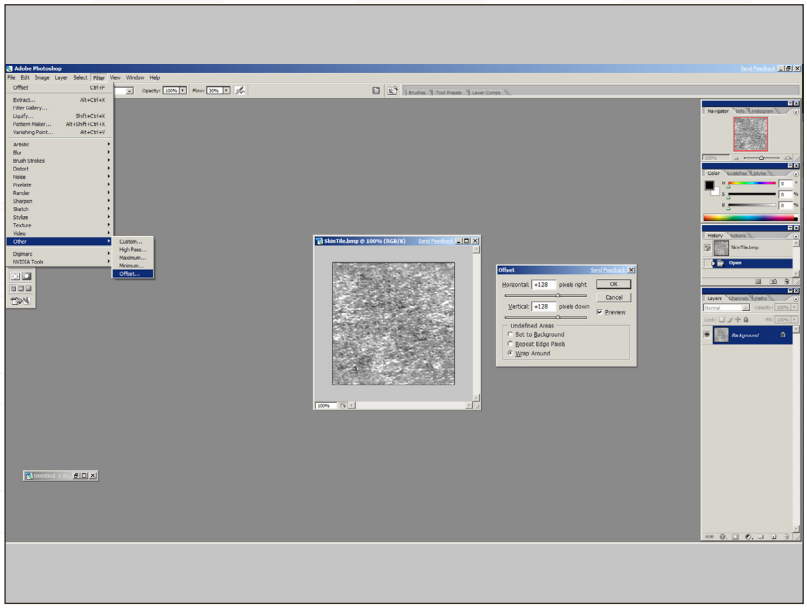


Fig 70

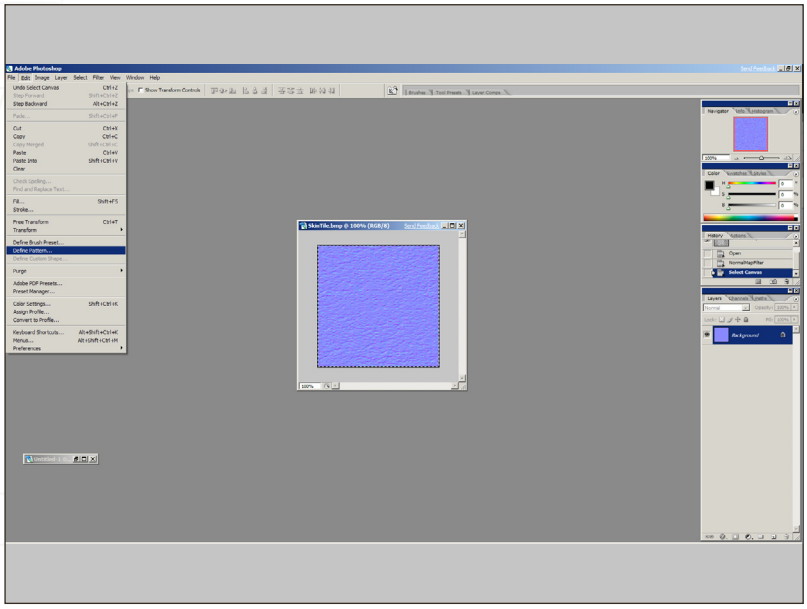


Fig 71

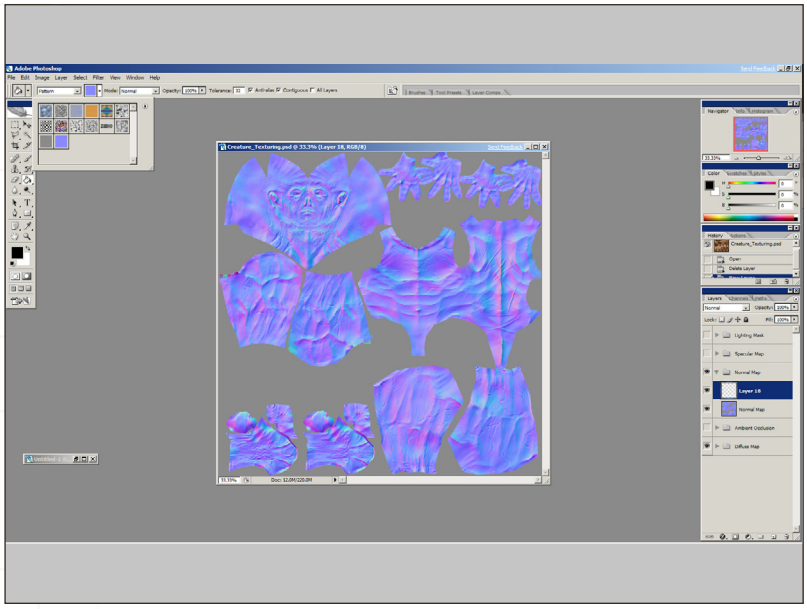


Fig 72

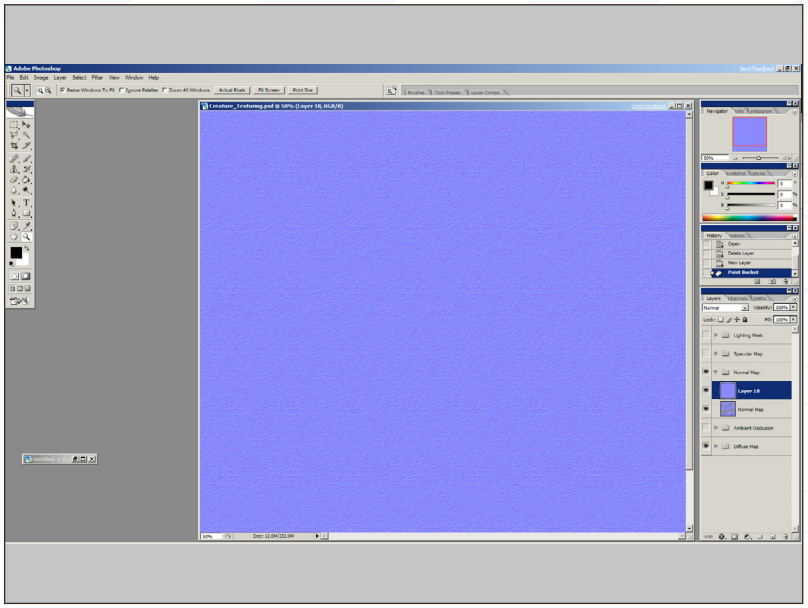
sure that there are no seams visible here. If your texture is not tileable, you should see four distinct squares. Using the Clone Stamp tool, the shortcut being S, clone various sections of this texture, or another greyscale skin texture, by Alt + clicking on a location you want to copy, and then painting on the location you want to copy to. Try to use a hard brush most of the time so the texture does not become dirty, which is a danger of using the Clone tool excessively when using a soft brush. Keep on doing this until no distinct squares are visible. Try also to eliminate any major details or dark spots that might obviously stick out when the texture is tiled multiple times. Apply the offset one more time to check if your texture is truly seamless. If it is, you should not see any visible errors in the texture. It's important that our textures are tileable, as that way we can decide how small or large we want the detail to be (**Fig.70**).

71. As we're working with Photoshop and we want to create normal maps and save DDS files, we should download the Nvidia DDS tools for Photoshop, available from Nvidia's website (**http://www.nvidia.com/**). Once the Nvidia tools are installed you will be able to save and load DDS files from the File Open and Save dialogue boxes. You will also be able to access the Filter Nvidia tools menu where you can calculate and export normal maps. Click now on Filter > Nvidia > Tools > Normal Map Filter; this takes us to the Nvidia normal maps window where we can alter settings to give us different types of normal maps. The default settings should suffice for this skin tile, with the modification of changing the filter type from four samples to 3 x 3, which will give us a softer normal map. Click OK and let the Nvidia tools create our normal map for us. Now Select All to select our entire normal map and go to Edit > Define Pattern (**Fig.71**).

72. Open up our creature texturing file and create a new group called Normal Map. Put our creature's normal map inside of this group. Create a new layer above it and paste in our

skin tile. The easiest way to do so is to go to the Paint Bucket Tool Shift + G, and change the mode to Pattern in the tool specific menu. It may be on pattern already, but chances are it will be on Foreground (**Fig.72**).

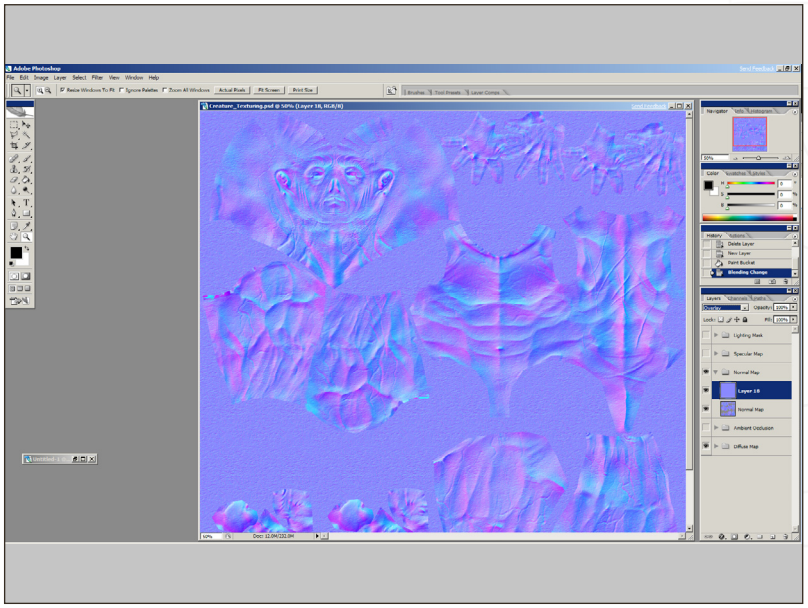
Fig 73



73. Click once over the image and it will be filled with our skin tile. As we created ours at 256 by 256 it is already the correct size for us and needs no modification (**Fig.73**).

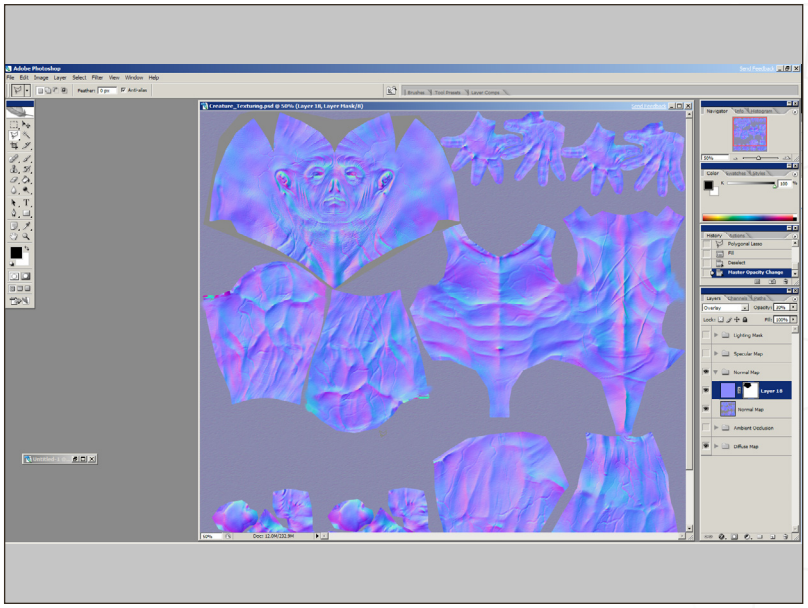
74. We can now simply set the layer mode to Overlay, our normal map now being visible through the obviously too strong skin tile (**Fig.74**).

Fig 74



75. Reduce the opacity to around 30%. This should be visible from a distance, but not look too over the top up close. You should also create a layer mask by selecting the layer and clicking the third button from the left at the bottom of the layers window; the button looks like a small white circle in a grey square. The mask is created completely white by default, the layer being 100% visible. Select an area around the head of the character and fill it with black to mask the skin tile off in this area. The head is already quite detailed and we don't need any more in there, or else it will just become messy (**Fig.75**).

Fig 75



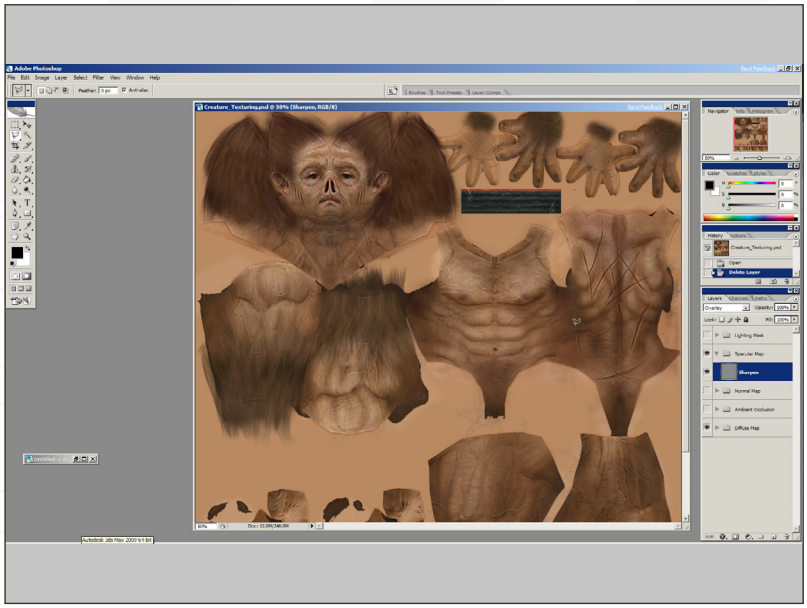


Fig 76

76. Save the file and create another new group called Specular Map. A specular map is generally used to tell the shader how bright the specular should be in a certain area of the map. Areas inside of the nostril, of stubble or fine hair, and otherwise dry parts will not be as reflective as parts such as the ears or lips. We need to communicate all that information in a map, which is why we have the specular map.

Start off by taking off Grey Cavity layer and duplicating it. Move it up into the specular map group. Now click Filter > Sharpen > Sharpen to apply a Sharpen filter to the layer. This brings out more detail in our map. Most of the effects we will do during the creation of the specular map will be adjustment layers. If in the future you decide to modify the diffuse map, remove hair, or change the skin texture, our specular map will be updated automatically and simply need a re-export, as opposed to a complete rework (**Fig.76**).

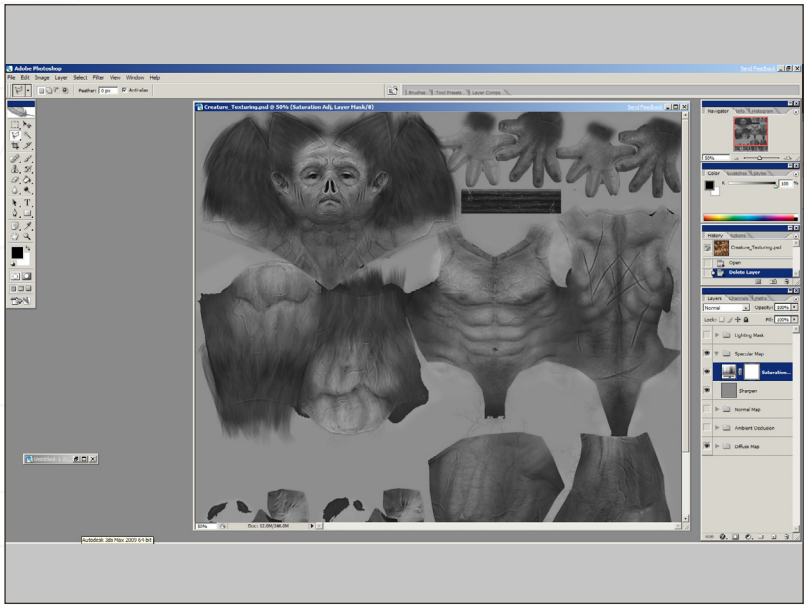


Fig 77

77. Add a Hue/Saturation adjustment layer above the Sharpen. To add an adjustment layer click on the half-white half-black circle next to the layer mask and new group buttons. Decrease the saturation to 0 and hit OK (**Fig.77**).

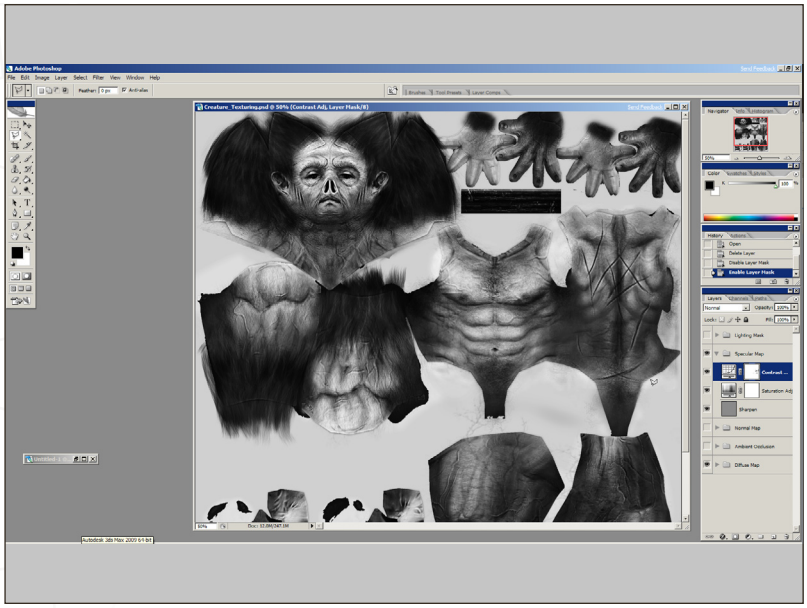
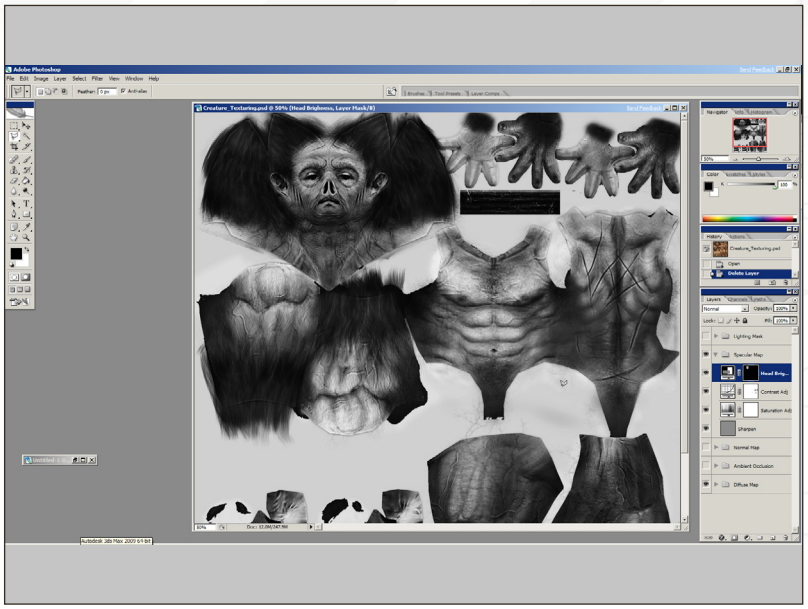


Fig 78

78. Add a Curves adjustment layer. You will see a diagonal line going from bottom left to top right. Add two points to the line, one near the bottom left and one near the top right, simply by left-clicking on the line. Drag the bottom left point you just created down slightly, and the other point up slightly. This will increase the contrast, deepen the shadows, and increase the highlights. The aim of this is to get close to a black and white map with fewer midtones, but it's important to not destroy any detail in our texture (**Fig.78**).

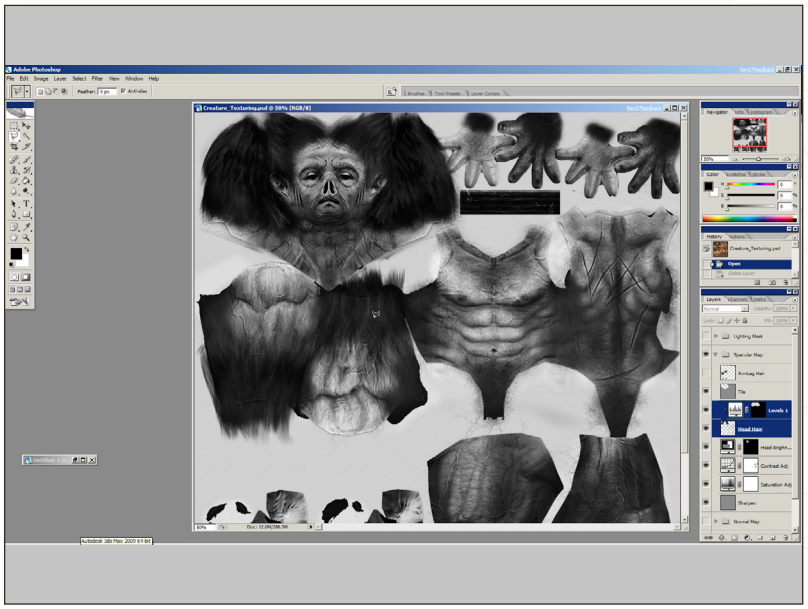
79. Now we have stronger contrast but our head is still too light, so add another Brightness/ Contrast modifier and reduce the brightness by about 15. Fill this mask with black and paint white only where the head is, to mask the rest of the texture from being affected (**Fig.79**).

Fig 79



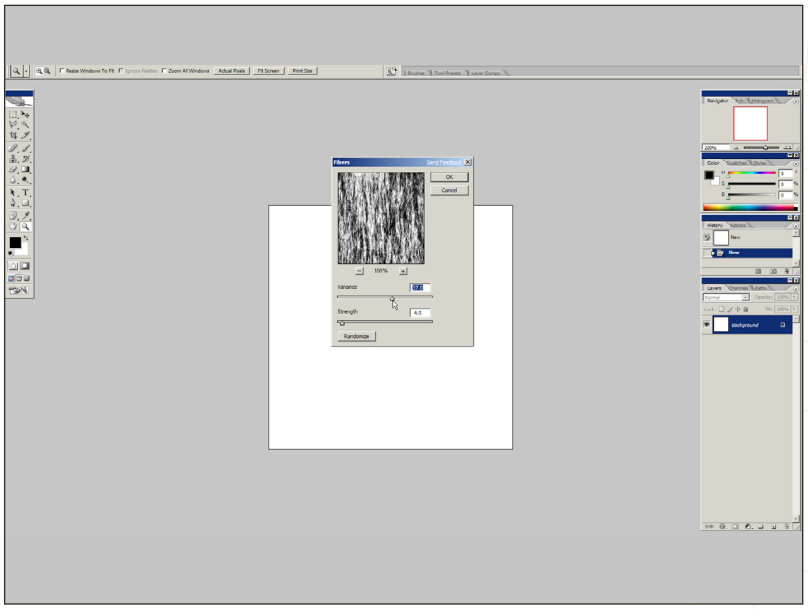
80. Take the hair layers from the diffuse map, duplicate them, and drag them also into the specular map. If you have more than one hair layer, merge them altogether at this point. Desaturate the layer and add a levels adjustment modifier above it. Now if you hold down your Alt key and hover between the levels adjustment and the hair layer, you will see a little chain icon. Click it and this will link the two layers together, so the levels adjustment will only apply to the linked layer. Within the levels adjustment options, drag the left-hand point towards the middle, and the right-hand point also towards the middle. This is another way to increase the contrast. The reason for doing this is so our hair stands out more on the specular map, so the specular will be broken in more places and the model will look more detailed. You can collapse the specular map group now, and we will move onto creating the eye texture (**Fig.80**).

Fig 80



81. Create a new document with a width and height of 512 pixels. Now create a new layer. Click on Filters > Render > Fibres and choose a reasonably high variance, a small strength, and then click OK (**Fig.81**).

Fig 81



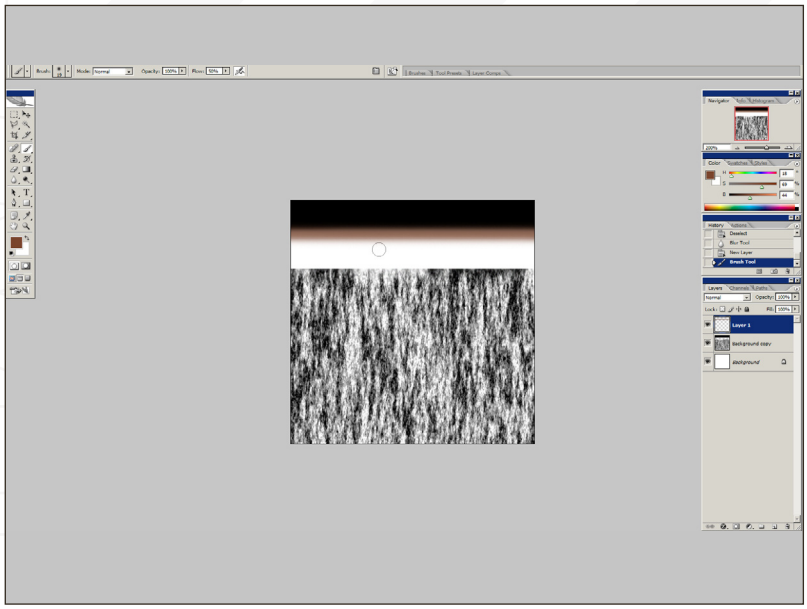


Fig 82

82. The Fibres filter is a quick way of creating some random streaks of noise that look somewhat organic. Create another new layer. Use the Free Transform tool to scale them down vertically from the top, and now, in that gap, paint a large line of black to be our pupil, and a smaller line underneath of brown (**Fig.82**).

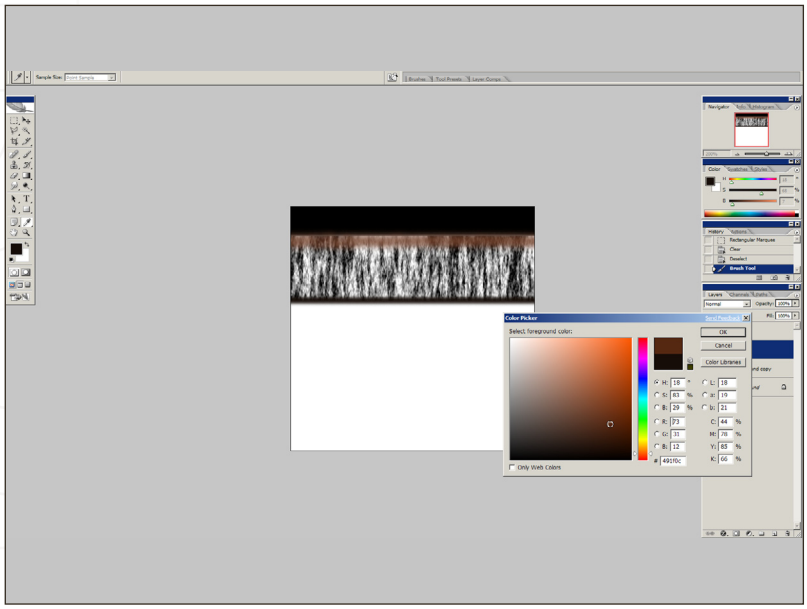


Fig 83

83. Use the Free Transform tool again to scale up the fibres and draw a darker line at the bottom of them (**Fig.83**).

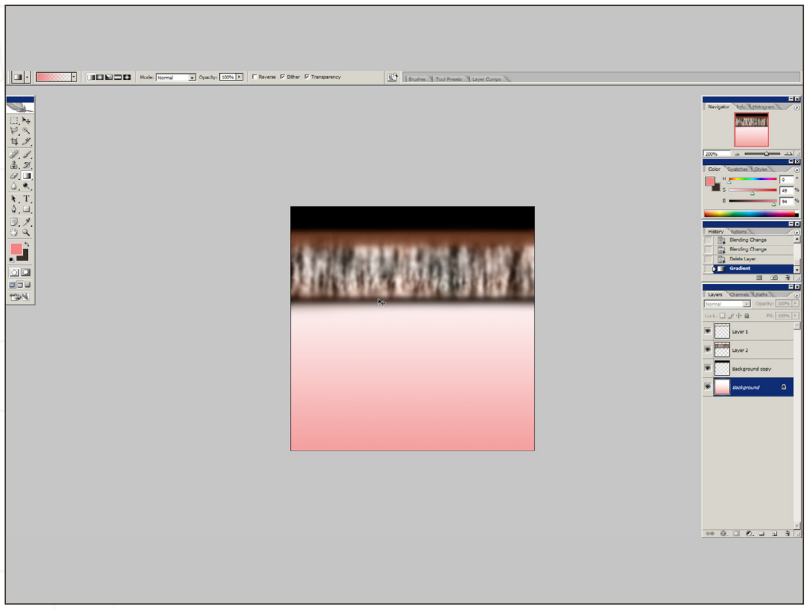
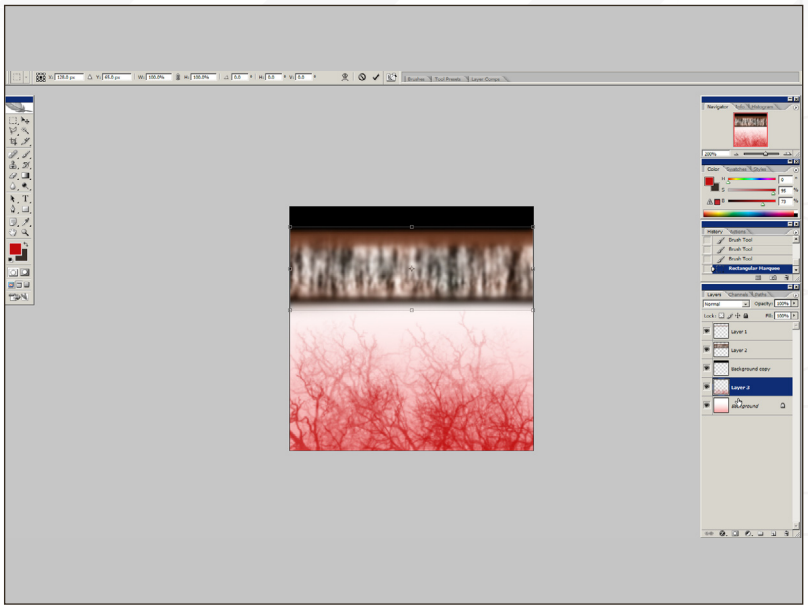


Fig 84

84. Select the layer with the fibres on and blur it considerably. On the background layer choose a pinkish foreground colour and create a gradient from top to bottom – the bottom being the pinkest and the top being white (**Fig.84**).

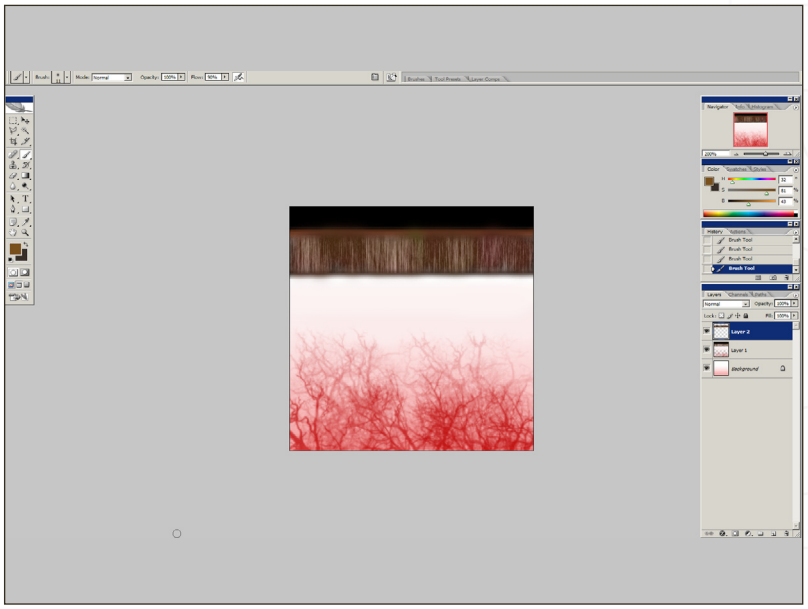
85. Create a new layer above the background layer. Choose a deeper red and, using our vein brushes, scatter some veins around – the bottom containing the most veins and the top the fewest. Merge the lines and fibres layers and use the Free Transform tool to scale them vertically slightly (**Fig.85**).

Fig 85



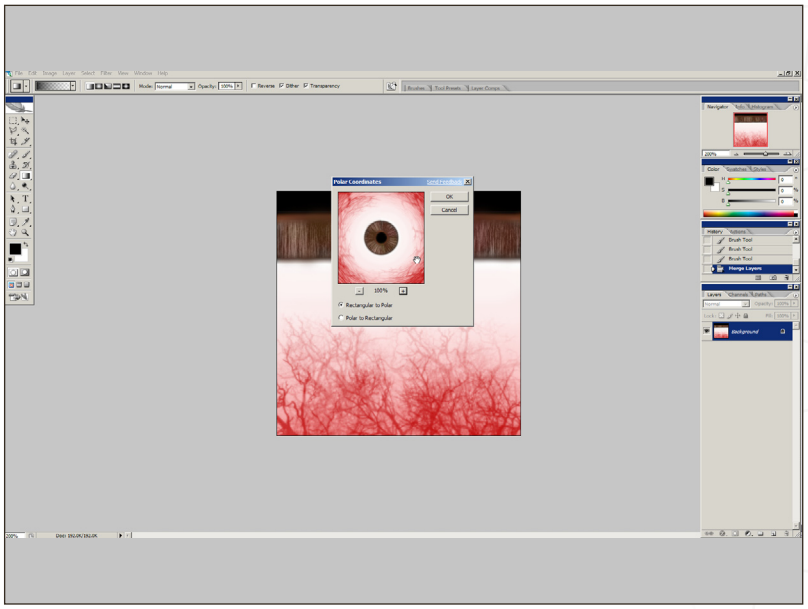
86. Now with the fibres section scaled, retain the selection, and in a new layer create additional fibres. We can reduce the contrast of these and use a layer blending mode to put back some of the sharpness. Using the paintbrush, hold down Alt, right-click over the texture and choose Colour. With this mode enabled you can paint over your image altering only the colour, without painting over any of the details. Give a little randomness to the fibres colours now (**Fig.86**).

Fig 86



87. Now we've created a simple map for our eyes, which we can go into more detail on later if we wish. Something of this calibre usually will suffice when the texture resolutions for eyes are considerably small, because they do not take up too much resolution on screen. Merge all of your layers together by selecting the top layer and going to Layers > Merge > Visible. Now with the layer selected, go to Filter > Distort > Polar Coordinates and make sure the setting is on Rectangular to Polar; click OK (**Fig.87a – 87b**).

Fig 87a



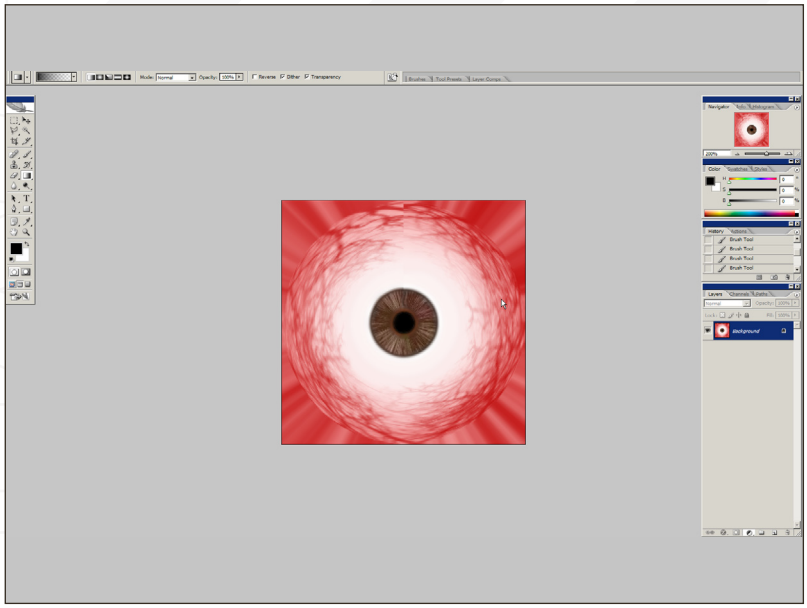


Fig 87b

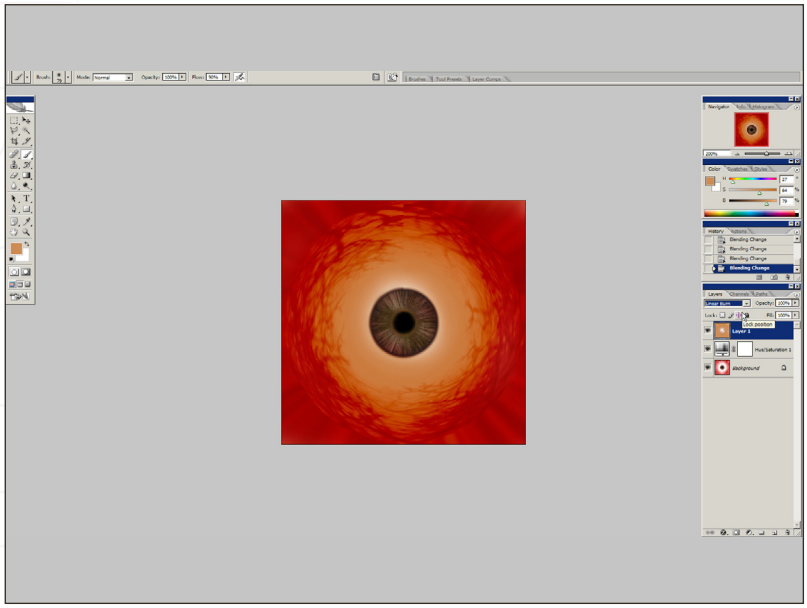


Fig 88

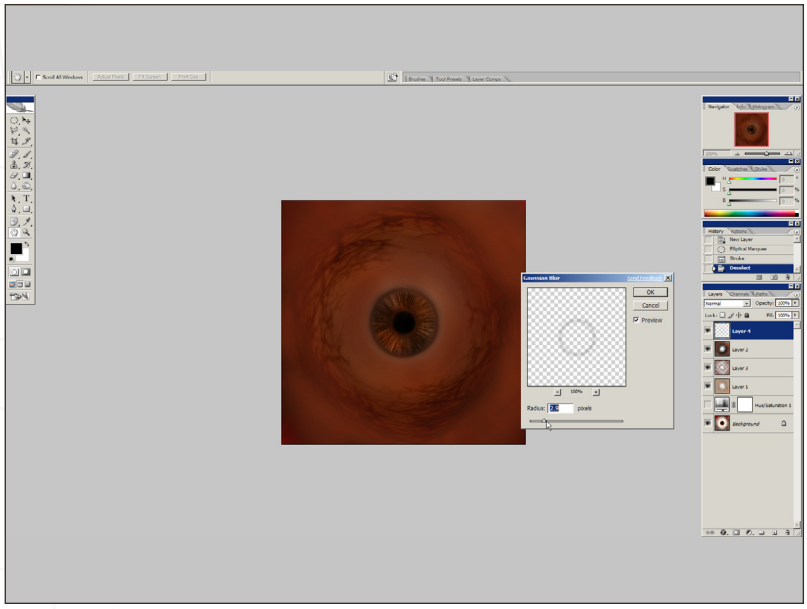


Fig 89

88. Generally, apes' eyes are somewhat darker and orangeier than humans', so let's paint that now. Create a new Saturation layer and tint the texture orange. Then paint a darker orange colour in a new layer above that, and set the layer blending mode to Linear Burn (**Fig.88**).

89. Create layers above that to darken and add volume to the eyeball texture. You can also paint a ring around the iris in black and apply a strong Gaussian Blur filter to this, and reduce the opacity a little. This gives the effect that the iris is actually a separate object underneath the cornea, the black ring simulating the shadow cast. Save off this file now as our eyeball texture (**Fig.89**).

We finally come to the end of the texturing process. We've created the majority of maps necessary for building a realistic and professional shader. The texturing process can sometimes be long and arduous, but with the techniques we have used here it can be quick, efficient, non-destructive, and manageable. In the next instalment we will create a basic 3-point lighting rig and an advanced character shader, along with hair and eyes. We will also look at realtime renderi ng options in 3ds Max 2009 and complete our character with some accessories and a weapon.

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NEXT GEN CHARACTER CREATION SERIES

This series of tutorials provides a comprehensive guide through the process of creating a 3D character intended for use within a next gen console environment. As such, the design of the model will be tailored towards the eventual aim of functioning within a game engine and viewed in real-time. The series will cover all of the key stages of the 3D pipeline from sculpting the initial mesh in ZBrush and optimizing it in the principal 3D packages, through to texturing and applying next gen shaders. The inclusion of ZBrush tutorials will address the methods of sculpting both a low-poly mesh as well as a highly detailed version used to generate a normal map, and accompany the remaining software specific chapters that will detail topics that cover mapping, materials, lighting and rendering.

Chapter 1 – Low Poly Modelling | Jul 09

Chapter 2 – High-Poly Modelling Part 1 | Aug 09

Chapter 3 – High-Poly Modelling Part 2 | Sep 09

Chapter 4 – Mapping / Unwrapping | Oct 09

Chapter 5 – Normal Mapping – Texturing

This chapter deals with the texturing part of the series and looks at how to generate normal maps, baking out lighting effects, and the techniques of painting in Photoshop using the aid of photographic reference. Seamlessly blending in photo references with hand painted techniques are a feature, as well as a section on painting eyes.

Chapter 6 – Materials, Lighting & Rendering | Dec 09

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- Free Low Poly Base Mesh & Textures





CHAPTER 5 -NORMAL MAPPING – TEXTURING

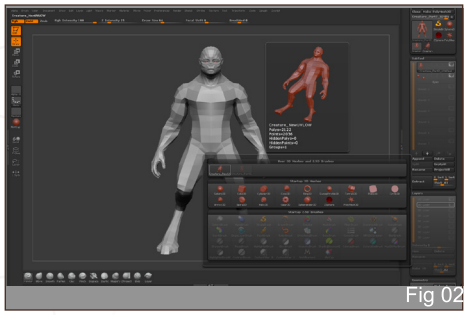
Software Used: ZBrush, LightWave, xNormal (freeware – see http://www.xnormal.net/), Photoshop

In the last part we looked at UV-unwrapping our character. This month we'll follow on from that by generating normal maps, baking out lighting using the free program XNormal, and painting our textures in Photoshop.

Normal maps revolutionized the games industry a few years ago, more specifically around 2003 when the original Xbox started to release titles that included normal maps. The Sega Dreamcast being the first normal map ready console, the Xbox was the first to really utilize them widely and catch the public's eye. They added another level of detail and realism to games, and now almost every new game includes normal mapping in some form.

Normal mapping in videogames works by having a high- and low-polygon mesh. A computer-calculated map alters the normals of an object in real-time to visually make the low-poly object look like the high-poly object, but without adding any more polygons. It reacts to lighting as the high-poly would and, with technologies such as CryEngine's occlusion maps, can even simulate shadowing in the recessed areas.

The normal map is usually a 3-channel map with each channel corresponding to one of the three axes – X, Y, and Z. Sometimes the alpha channel can also contain a height map. There are a number of different software and plugins out there to generate normal maps now, and


Fig 02

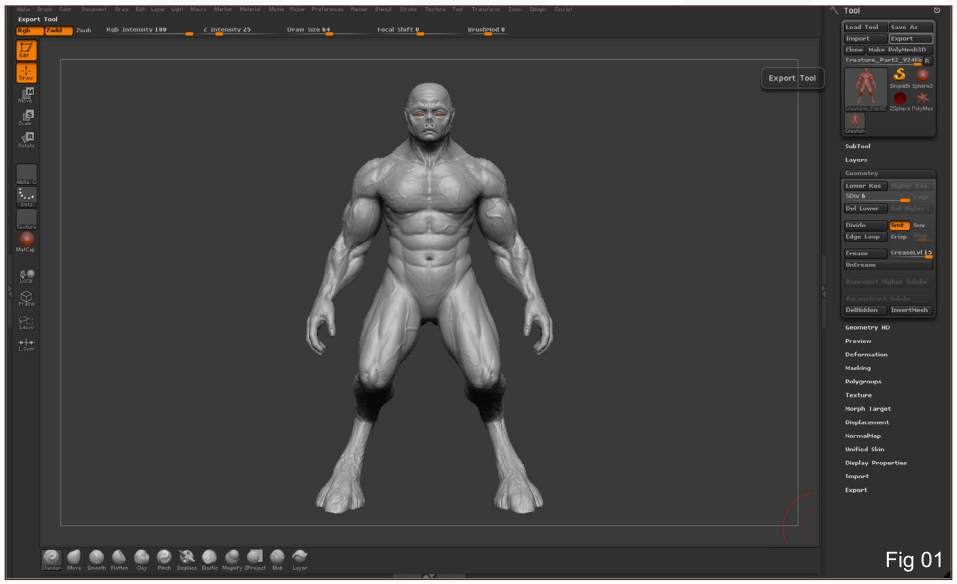


Fig 01

most applications have some built-in way of calculating them. LightWave has 'Microwave', Blender can calculate normal maps out of the box, and ZBrush has it built in and also comes with ZMapper. Tools like xNormal, CrazyBump, PolyBump, and others, all simplify the process in their own way, too.

1. Load up the model in ZBrush as normal, using the Tool > Open menu. Drag the model onto the canvas and press Q on your keyboard to make it editable. Now, the first thing is to export the highest resolution version. It's close to 2.5 million polygons, so don't be surprised if it takes a while to export. Make sure you are at the highest subdivision level and hit Tool > Export, then name it appropriately and wait for exportation (**Fig.01**).

2. Now let's move on to creating a normal map from within ZBrush. There are a couple of ways to do this – one being to use the ZMapper plugin, which comes with numerous options to export an optimal normal map. Another way is to simply use the default ZBrush normal map generation, which I will do here.

Drop down to the lowest subdivision level by pressing Shift + D. Now switch to the ZSphere tool. Go to Tool > Import and import the final unwrapped character mesh from the last tutorial. To calculate the normal map from within ZBrush, the topology must be the same for the high and low resolutions of the mesh. Therefore, we will need to project the detail from our completed high poly sculpt onto a divided version of the new low-poly.

With the low-poly model imported, switch back to the original high-poly sculpt and expand the Subtools palette. Click on Append and select the newly imported low poly (**Fig.02**).

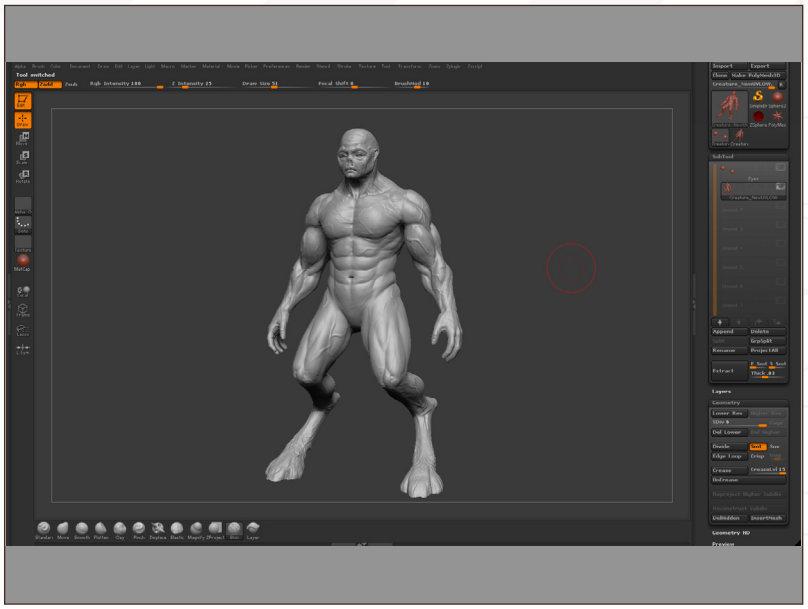
3. Under Geometry, click on Divide and match the resolution of the original. My original high-poly sculpt had 6 levels of subdivision, so I'll divide the new mesh to that level also. Hide the eye model by clicking on the eye icon on the right of the SubTool. Make sure your new model is selected. You can see which SubTool is active as its name will be darker and the SubTool ringed with a border.

Now click on the button labeled Project All. This will project all the detail from our high-poly model onto our low-poly one. If you kept other SubTools visible it would project those onto the new model also, so it can be useful for creating single meshes in a lot of situations. Projecting all can take some time, depending on the amount of polygons your mesh has.

Once the projection is complete, delete the original high-poly sculpt and you're left with

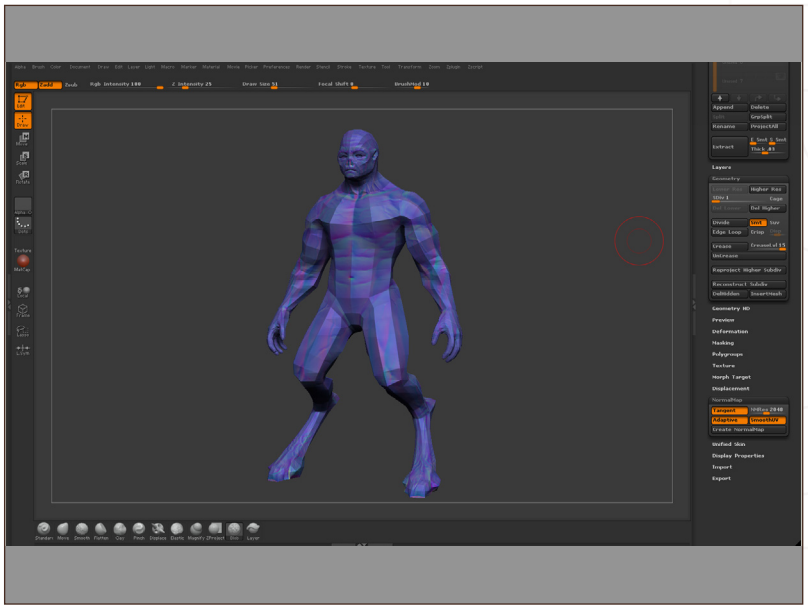
what is hopefully an identical version with our new final unwrapping. If there are areas where a few polygons are sticking out or stray use a Standard brush and smooth them back into place. Sometimes you may need to re-sculpt small areas, but usually the projection is quite accurate. It can help to open the Brushes menu and turn on Cavity Mask, which will retain any surface detail you may have added already, whilst allowing you to work on the mesh (**Fig.03**).

Fig 03



4. Now we'll move on to generating the normal map. Go to your lowest subdivision level, scroll down inside the Tool menu to NormalMap, and expand the palette. Inside of this we have a few options that can help us generate a better looking normal map:

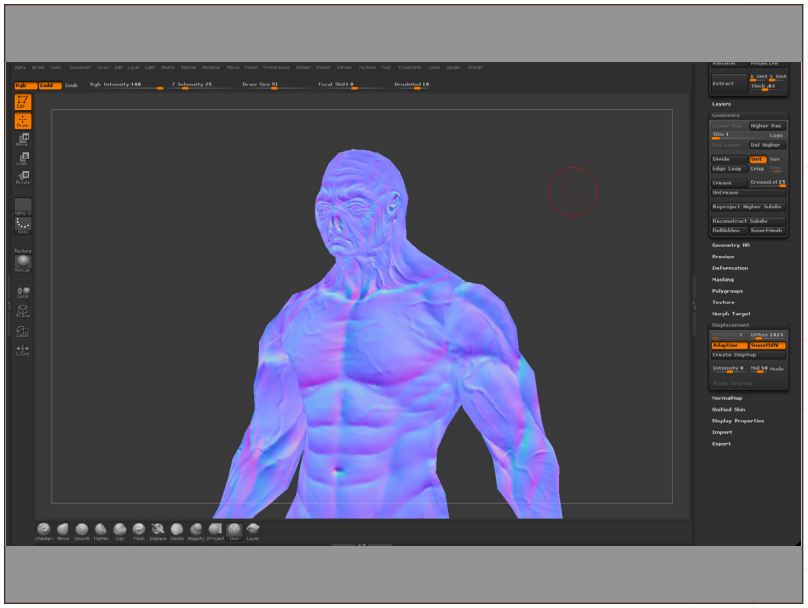
Fig 04



• Tangent – If pressed, the co-ordinates of the normal map are tangential or local to the object. If unselected they are in 'world space', or global. A good rule is that if the object is to be static in the world, you can use global, but if the object will be moving or deforming you can always use tangent space

• **Adaptive** – If pressed, the map will be more detailed in areas of more concentrated detail. It sounds like common sense but it takes longer overall to render the map if this is selected. To save a small amount of time in testing you can turn it off, but I recommend keeping it on most of the time

Fig.05



• **NMRes** – Forget the confusing name; I don't think there was enough space in the tool palette to write something clearer. This is simply the normal map resolution, or map size. In our case it will be 2048, and as all maps are square there are no height and width specific fields

• **SmoothUV** – When pressed, UV coordinates are smoothed when calculating the map. If your map appears faceted somewhat, make sure this is pressed

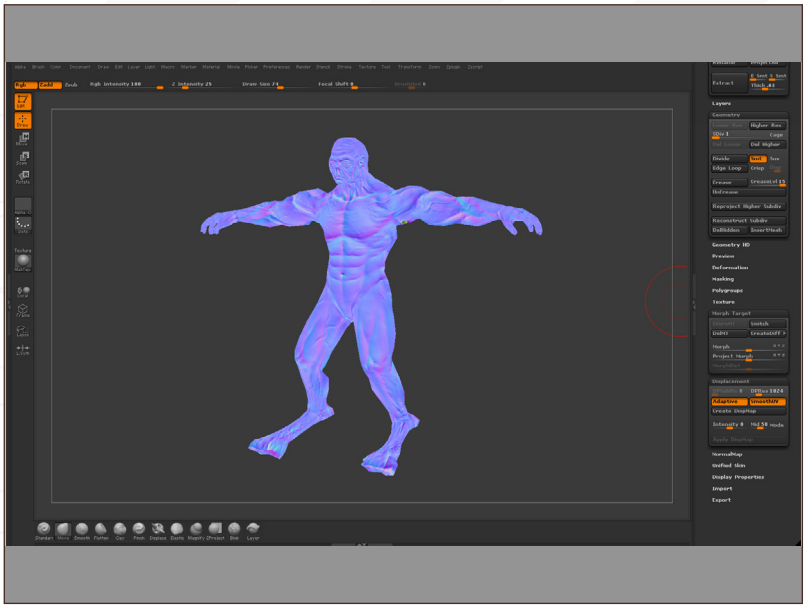


Fig 06

Go ahead and click the Create NormalMap button and wait for it to complete its calculations (**Fig.04**).

5. The normal map now appears as a texture map on our model. To export it, we can go to the Texture menu and click Export, as it's already the active texture. Name it accordingly and save it as a .psd for optimal quality.

Go to the Render menu and select Flat Shade so you can check if any sections of the map have been miscalculated. You will be able to see the texture with full self illumination, making it easier to spot errors (**Fig.05**).



Fig 07

6. The normal map looks good to me, with very few errors at all. The only error is in the area on the back of the legs where the upper and lower legs are very close together. Since we are inside of ZBrush and our low- and high-poly models are essentially both the same, areas like this are surprisingly easy to fix. Simply drop to a low subdivision level and, using the Transpose tool, straighten out the leg slightly and raise the arm up a little bit. I know what you're thinking: 'I don't want to destroy my mesh!' That's where ZBrush pulls another trick from out of its seemingly never-ending sleeve. Under the Tool > Morph Target palette before you start to transpose, hit the button labeled StoreMT. We have now stored a morph target, so after we create the normal map we can drop back to it as if nothing happened.

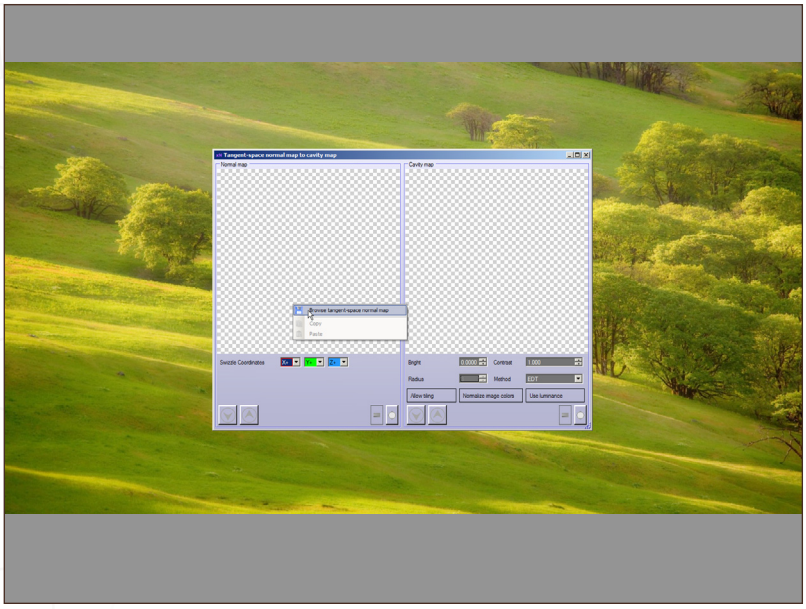


Fig 08

Go ahead and make the changes to the model using Transpose by moving some limbs out of the way. If you are getting errors in the hands, also move the fingers further away from each other (**Fig.06**).

7. Once you are done, recalculate the normal map, check the errors, and hit the Morph Target > Switch button. The model will revert back to its original position, but this time with the newly calculated normal map.

Switch to your lowest subdivision level and export this model to a separate folder. Label it accordingly, and then in the same folder export the highest resolution model. The second will take a little longer but we only need to do this once.

These meshes will be used for calculating our light baking, or ambient occlusion maps from within xNormal. We export these models because, in order to create good optimum maps, the low- and high-poly models should have the same UVs. It speeds things up and cuts down on the time needed to create cage meshes, and other solutions to block rays from hitting parts of the model where we don't want them to.

We can close ZBrush now, as we won't need it again. The next part of the tutorial will use the software, xNormal. It is completely free and programmed by a real genius and generous guy, Santiago Orgaz. Just head to **http://www.xNormal.net/Downloads.aspx** and download the latest version of the software. XNormal is becoming widely used in the games industry, with many AAA companies using it on a daily basis.

Of course, if you do not have or do not want to get xNormal you can skip this step and calculate a global illuminate map in LightWave using your high-poly object. (I will briefly show you a technique for doing this in a moment.)

On the tutorials section of the xNormal website, you can watch a quick overview of the interface, buttons, and features included in xNormal. I suggest doing this to familiarize yourself with it before continuing (**http://www.xnormal.net/Tutorials.aspx**).

Open xNormal, and click on the Tools button (**Fig.07**).

8. Now click on 'Tangent-Space normal map to cavity map'. This will turn our ZBrush-generated normal map into a cavity map that we can use to add detail to our texture almost instantly. Up

Fig 09

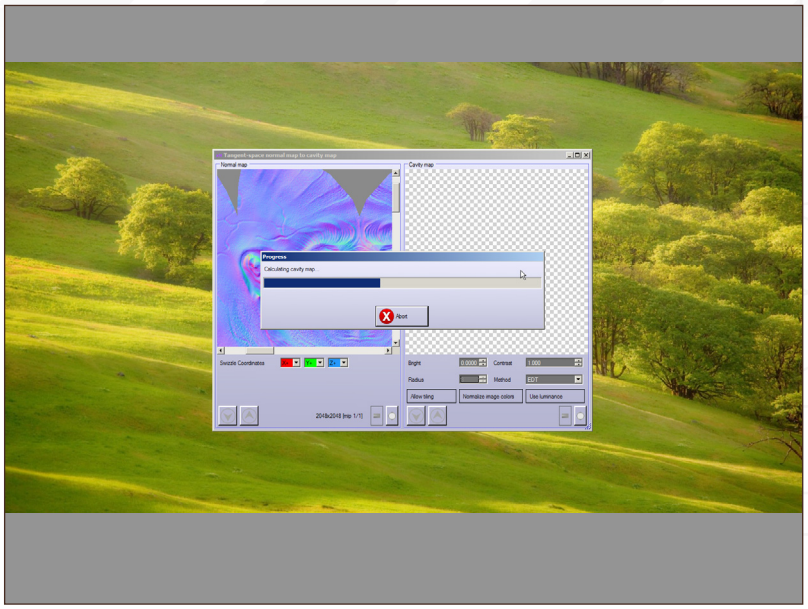


Fig 10

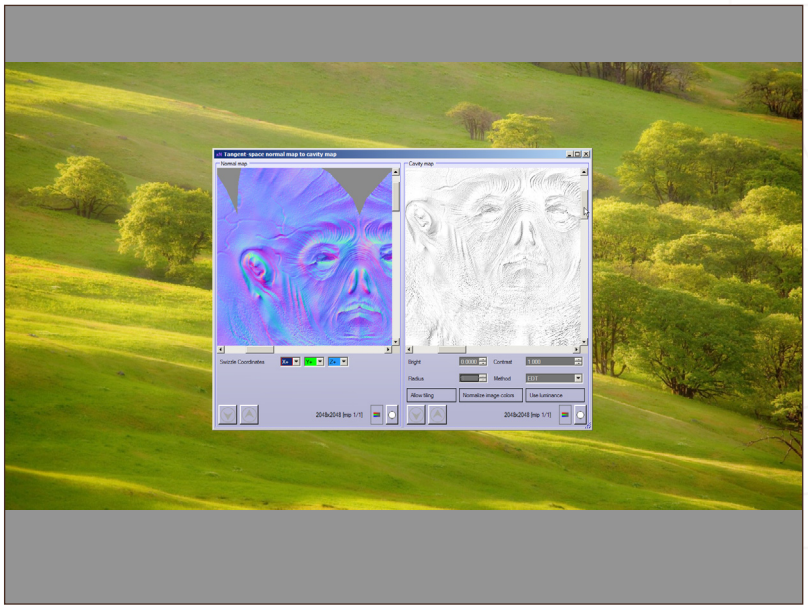
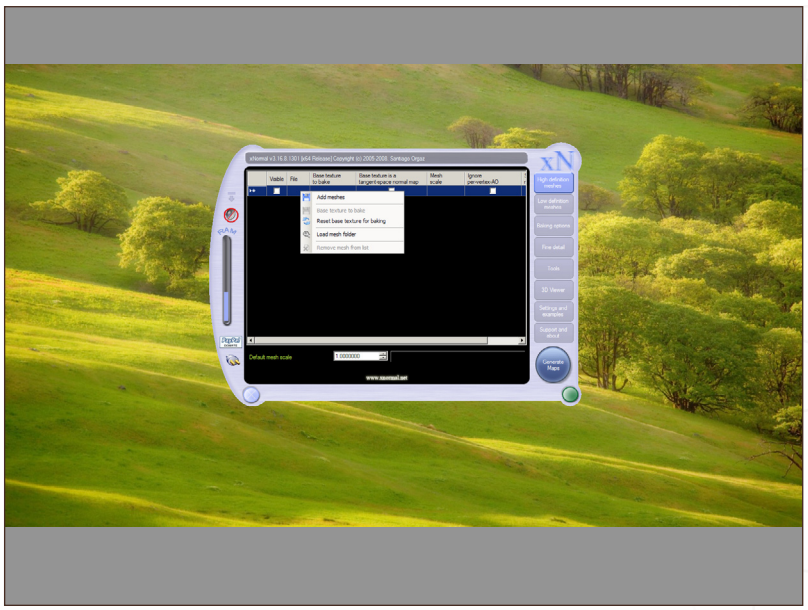


Fig.11



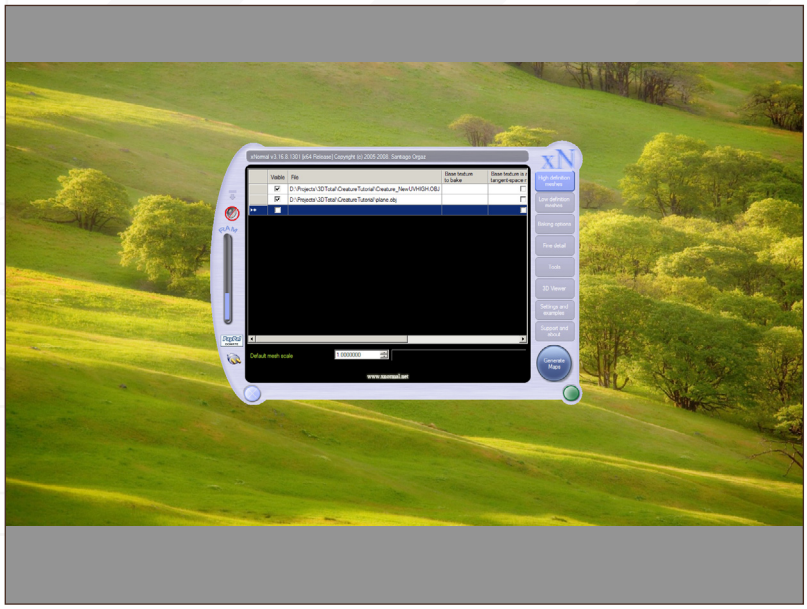


Fig 12

pops our Tangent-Space normal map to cavity map window; the left-hand side of our map will be converted, and the right is where we will preview the converted map.

Right-click over the left-hand side box, and select 'Browse Tangent-Space normal map'; once the explorer window opens, navigate to the location you saved the normal map and select it (**Fig.08**).

9. Now right-click over the box on the right-hand side and click Generate (**Fig.09**).

10. It's really as simple as that. A progress bar will show the time remaining and in a few moments the right-hand side will be filled with the cavity map preview (**Fig.10**).



Fig 13

11. Right-click over the cavity map on the right and click Export Cavity map. Save the file and name it accordingly. We can also modify the settings of the conversion to give us different and interesting cavity results. Try changing the method to EMB and the contrast to 1.5, and regenerating. Export this result also, as both will be useful for adding detail in the texturing.

Make sure to export with a format that allows an alpha channel because, depending on the setting, the white version is usually saved in the alpha channel. TGA will work fine.



Fig 14

At this point we can also produce our ambient occlusion map, which will save hours of time painting the muscles and shading ourselves. We need to jump into LightWave first to export another model for the ambient occlusion map generation. Load in your character model and create a simple plane, placing it underneath the character as if he were standing on it. This plane model is needed for the calculation of the ambient occlusion map. Without it, the maps all turn out overblown and white. Once you have made the plane and positioned it correctly, export it as an OBJ to the same folder as before.

Now, back inside of xNormal, click on 'High definition meshes' on the right-hand-side menu bar. Here we have our place to import our high-poly sculpt, along with the plane that we just exported. The plane goes with the high-poly instead of the low-poly, as we are casting rays from the high-poly and filling in the UV map of the low-poly with the results. Any other meshes you want can be placed in the 'High definition meshes' slots to cast shadows. If a character always wears a huge hood, you could also place it in here as a separate mesh to cast shadows on the character (**Fig.11**).

Fig 15



12. Right-click under the File field and click Add meshes. Locate the exported high-poly model, and click Open. Right-click again, select Add meshes, locate the plane OBJ file we exported, and then add it (**Fig.12**).

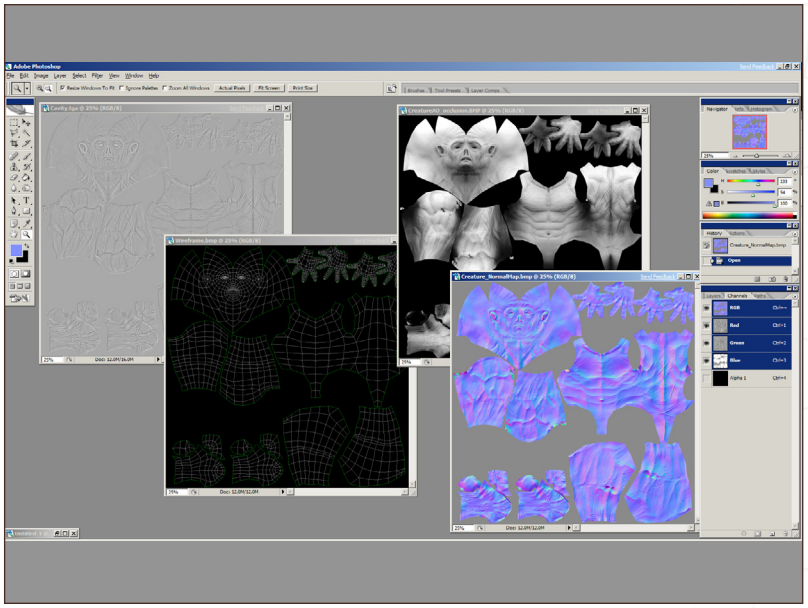
Fig 16



13. Now go to the 'Low definition meshes' tab and, as before, right-click and add the low-poly mesh. There are some important options here that we need to modify, so using the scroll bar, scroll all the way across to the end on the right. Turn on the check box labeled Match UVs. We can also modify the maximum frontal and rear ray distances, but for now a value of 0.600 and 0.800 works well for me. Depending on your mesh it may be different, and some trial and error will find the right result (**Fig.13**).

14. Go on to the 'Baking options' tab and click on the three dots at the end of the Output File section. Type in a name for your map and select a file type. Make sure the size is also at 2048 by 2048. I've set the background color to black, but white works well too. I suggest following the same settings shown so your output result will be similar to mine as we go through the rest of the tutorial.

Fig 17



Click on the dots next to Ambient Occlusion, under 'Maps to render'. This brings up the Occlusion map window where we can set the options for the way the map will be calculated.

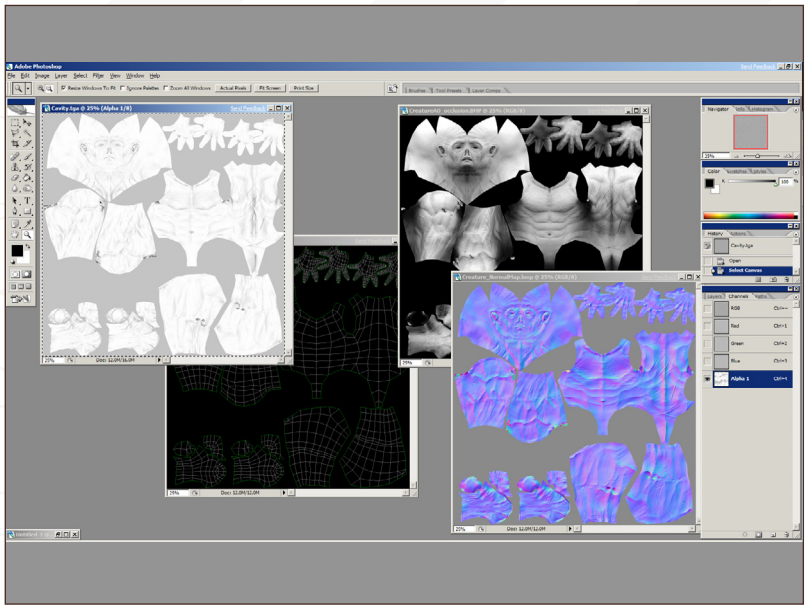


Fig 18a

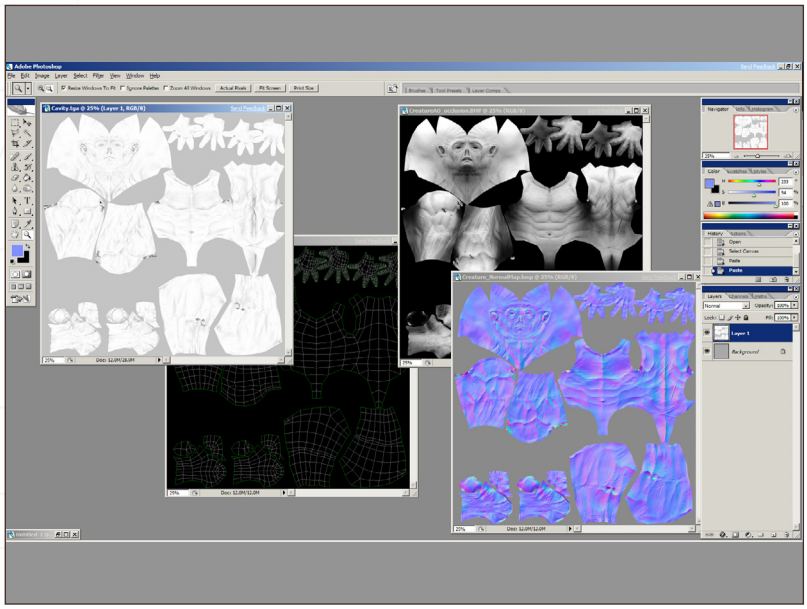


Fig 18b

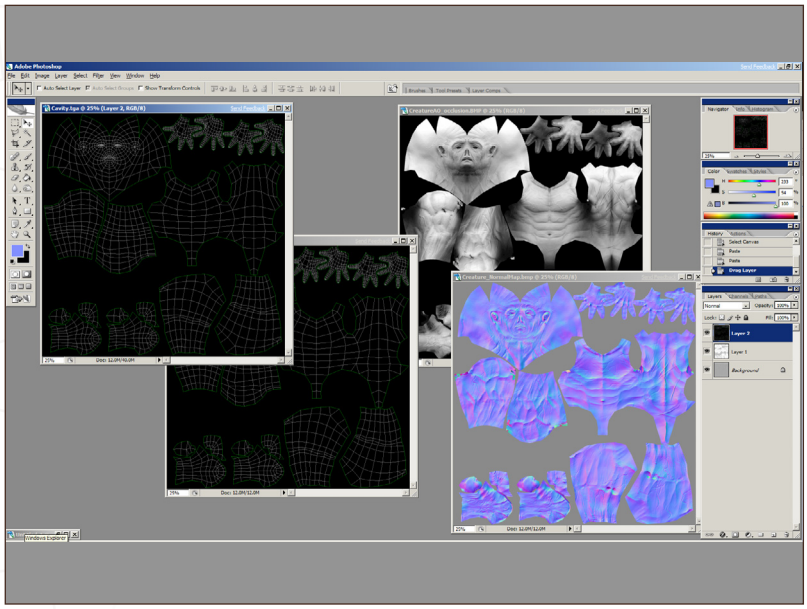


Fig 19

The important values to change are:

• **Rays –** The number of rays cast from one point on the mesh: a higher value giving a softer and more accurate solution at the cost of render time; a lower value is quicker to render but is dirtier. I find a value of 256 is optimal here

• Leave **Occluded Color** and **Unoccluded Color** as they are. We can always colorize the map later in Photoshop

• **Spread Angle** – Increase this value for a softer map, with larger forms being smoothed out and smaller detail not picking up much shadowing. Decreasing the value will result in a sharper map, and areas of indentation will pick up more detail. A value of 150.00 will produce a quite sufficient map for our use

• **Limit ray distance** – This option should usually be left off. Most of the results whiteout and become over bright when it's turned on

You can modify the other values to your tastes, but bear in mind we can produce a lot of the same results by calculating the map and editing it in Photoshop later (**Fig.14**).

15. With your settings chosen, all that's left to do is click the big blue Generate Maps button. Notice that once you click it, xNormal jumps into action. You can preview the result of the ambient occlusion generation by clicking on the drop-down box at the top of the Preview window and selecting 'Notify tile updates'. Bear in mind this is noticeably slower than when this option is turned off, so I suggest only using it to check on progress (**Fig.15**).

16. The map is being calculated … Sit back, make a cup of tea, and relax for a few minutes (**Fig.16**).

17. With our ambient occlusion, cavity maps and normal map all ready to be used, we can start to

set up the Photoshop file to create our textures (**Fig.17**).

18. We must open up all of our textures we've created so far in Photoshop. Take the cavity map and extract the alpha by going to the Channels palette, selecting Alpha 1, selecting all by hitting Ctrl + A, copying the selection by pressing Ctrl + C, and then selecting RGB. Now switch back to the layers palette, select the Background layer, and hit Ctrl + V. The alpha should then be pasted in a new layer above the background (**Fig.18a – b**).

19. Switch to the wireframe texture window now. Make sure you are in Move mode (V), and the background layer is selected. Hold down Shift and click on the texture with the left mouse button, dragging it onto the cavity texture sheet we were previously working on. By holding down Shift we make sure the whole of the texture is snapped directly onto the new one in the same place. This eliminates any guesswork in matching them up. However, it only works when both textures are the same size (**Fig.19**).

20. Hit Ctrl + I to invert the wireframe image, making the edges black and the background white. Go to the layers palette in the drop-down menu above the layers, and change the layer mode to Multiply. The white will now be invisible and only the red and black lines remain. I also recommend taking down the opacity of the layer to around 20% (**Fig.20**).

21. Click on the background layer and drag it downward onto the 'Create a new layer' icon (it looks like a page with the bottom left corner upturned). Then proceed to delete the old background layer. Now click on the Create a new layer icon and position it underneath the background copy layer by dragging and dropping (**Fig.21**).

22. Drag over both the normal map and the occlusion map, using Shift each time to snap it in place. Now fill Layer 3 that we created with a skin tone color. You may pick one directly from

Fig 20

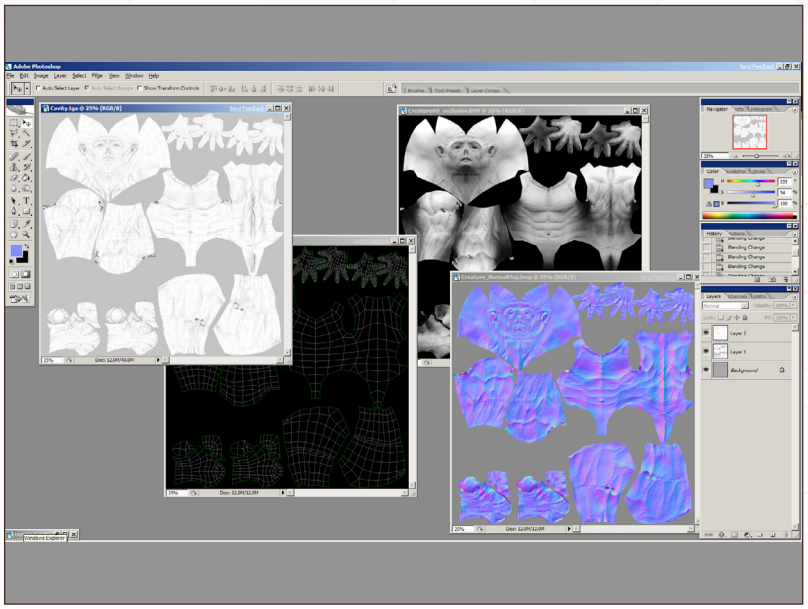


Fig 21

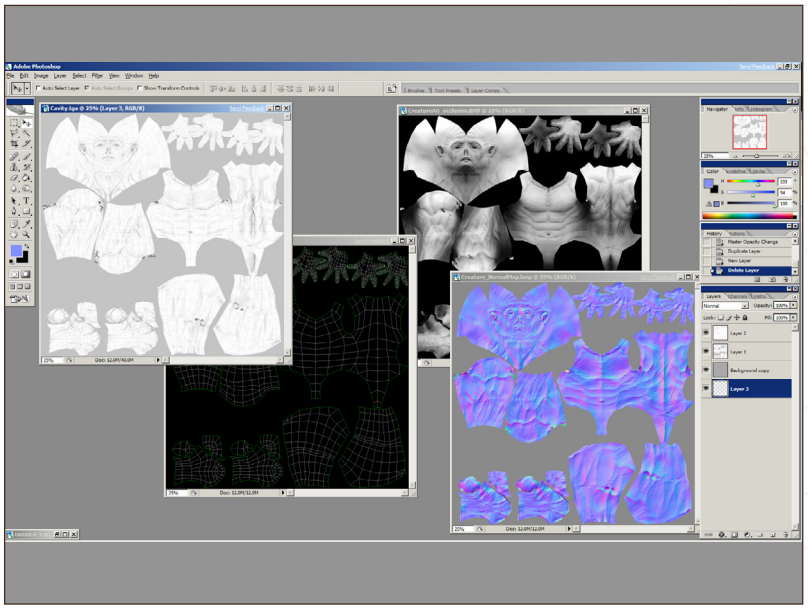
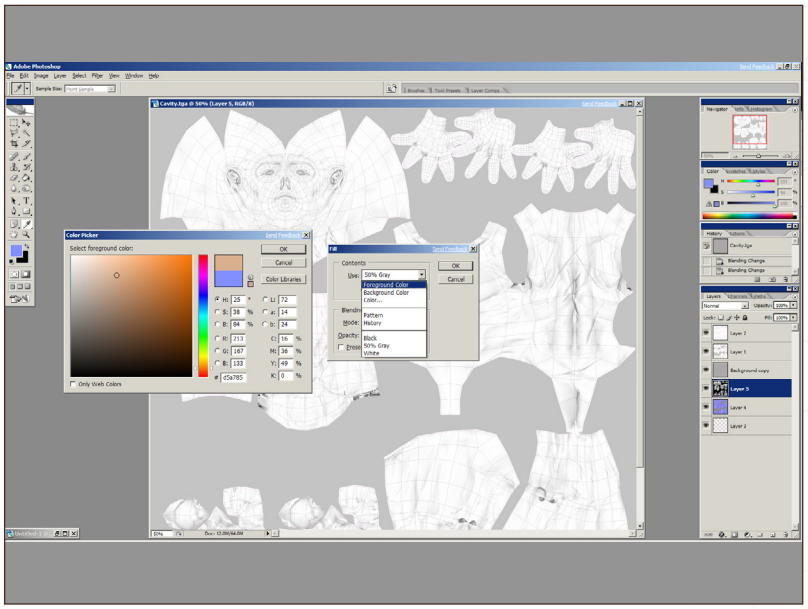


Fig 22



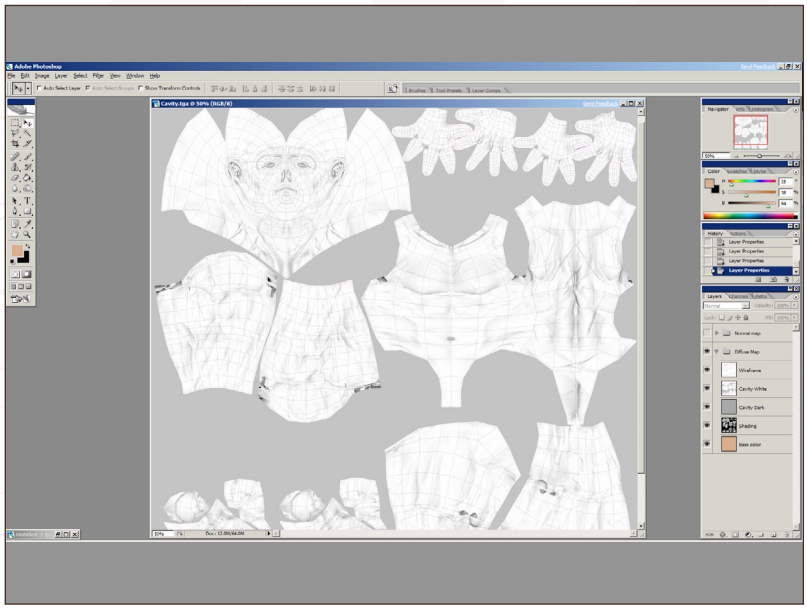


Fig 23

a reference photo by using the 'I' shortcut key to access the Eyedropper tool, and then clicking on the skin somewhere. You can also select one from the color swatches in the tool palette on the left-hand-side. Fill the layer with this color by pressing Alt + Backspace, or using the menu Edit > Fill > Foreground Color (**Fig.22**).

23. Now is probably a good time to give your layers appropriate names. I also take this time to create a new group for the diffuse map and the normal map ready for later. The 'Create a new group' button is next to the Create a new layer button and looks like a folder (**Fig.23**).

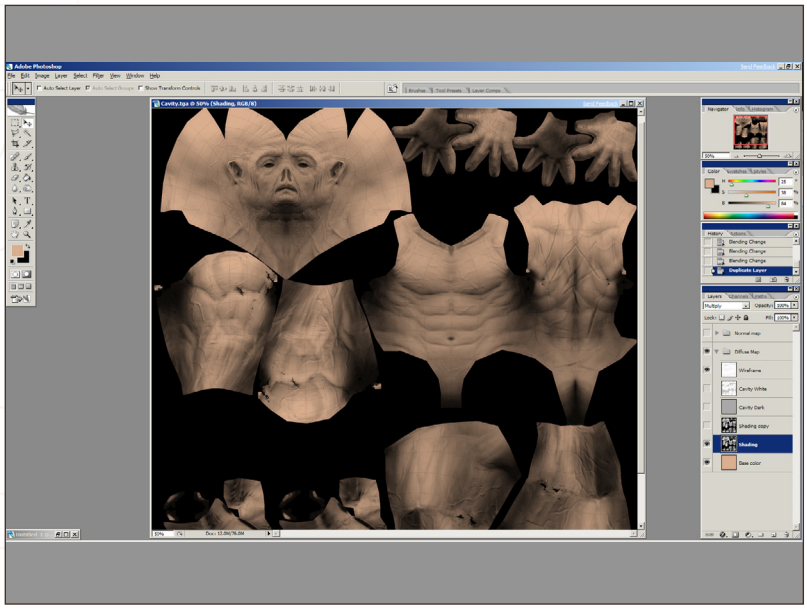


Fig 24

24. Hide both cavity layers by clicking on the eye on the left of the layer. Change the layer mode for the shading layer to Multiply. You will now see the base color show through in the white areas of the occlusion map. We already have a map that looks quite far along in the texturing process, with all muscles and detail defined (**Fig.24**).

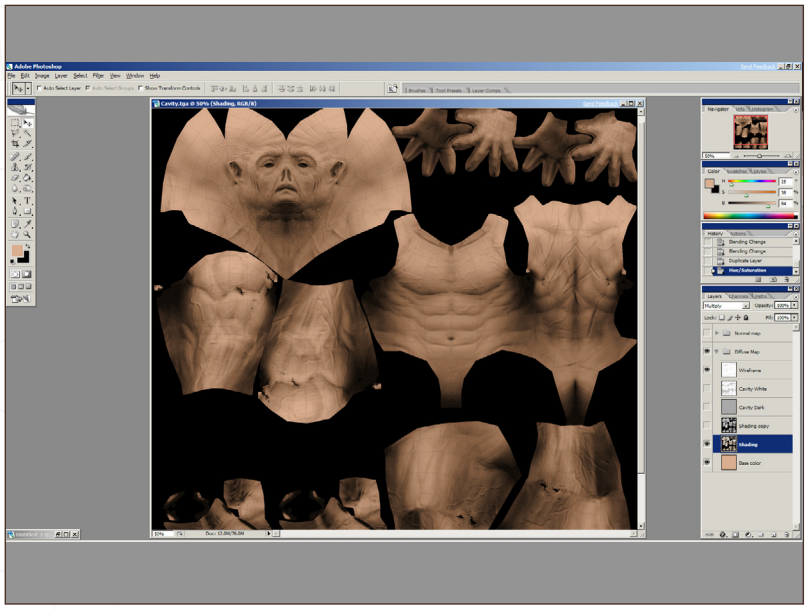


Fig 25

25. At this point I usually duplicate the shading layer and then hide the duplicate. Now select the original shading layer and go to Image > Adjustments > Hue Saturation. Click on the box labeled Colorize and tint the map a little red, since skin is not grey in areas of shadow, it actually takes on a more saturated red color. Instantly, our texture feels more alive (**Fig.25**).

26. Change the layer mode for the cavity dark layer to Overlay and reduce the opacity to around 25%. The cavity white layer however can be set to Multiply with an Opacity of 50%. It's important to know how blending modes work and what they can be used for. There are many guides online to really find out how each

one works, but usually running through the drop-down list with the up and down arrow keys quickly gives you a variety of different effects from which you can pick the most fitting for the situation.

Our two blending modes here, Multiply and Overlay, are fairly simple (**Fig.26**):

- **Multiply** looks at the cooler in the texture of the layers below it and multiplies it with color in the corresponding area of the layer. Multiplying white gives no effect, and effectively produces transparent areas. Black creates 100% opaque areas. Any color painted in the multiply layer over other colors will result in a darker color

- The **Overlay** blending mode works in a similar way to Multiply, but instead of white as having no effect, 50% grey is effectively transparent. Any light or dark colors painted onto the map will be screened or multiplied with the colors underneath, brightening or darkening them. The Overlay blending mode retains shadow and highlight information in the underlying colors, making it a good choice of blending mode for adding tileable detail, or in this case light and dark information from a cavity map

Fig 26

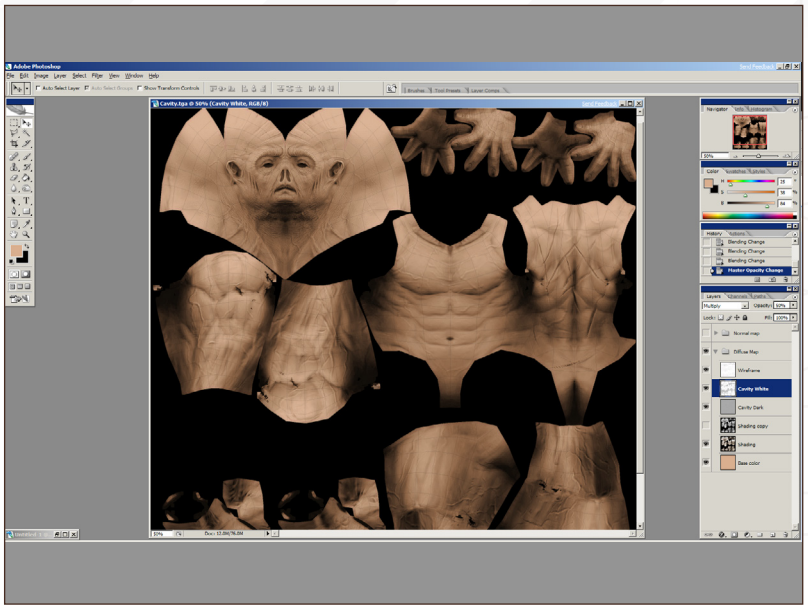
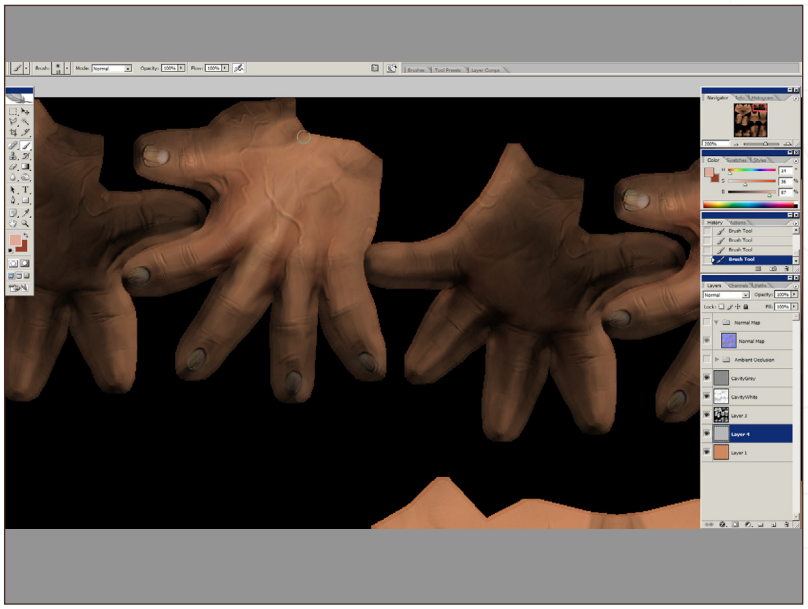
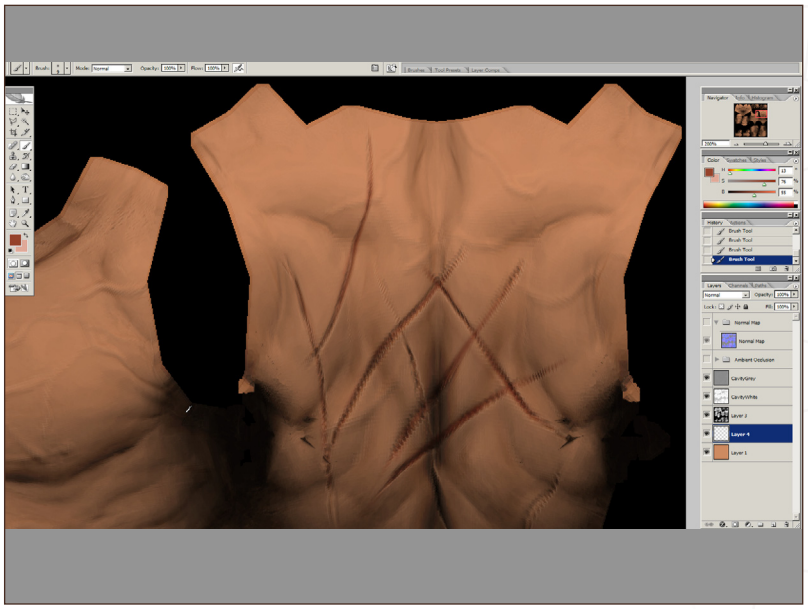


Fig 27



27. Let's move onto painting the actual texture now. Create a new layer above the base color layer. Now, starting with the hands, choose a lighter color than the base color and paint over the knuckles and all protruding parts of the top side of the hands. Also paint in the fingernails at this point to differentiate their color from the color of the skin. You can also paint the wrinkles to give them some volume. We don't want to be painting too much highlight and shadow information into the map as the normal map and specular maps should handle most of this job, but it's always good to add a little bit in the diffuse map just to accentuate the shading. You can also choose a darker color at this point and paint the deeper parts (**Fig.27**).

Fig 28



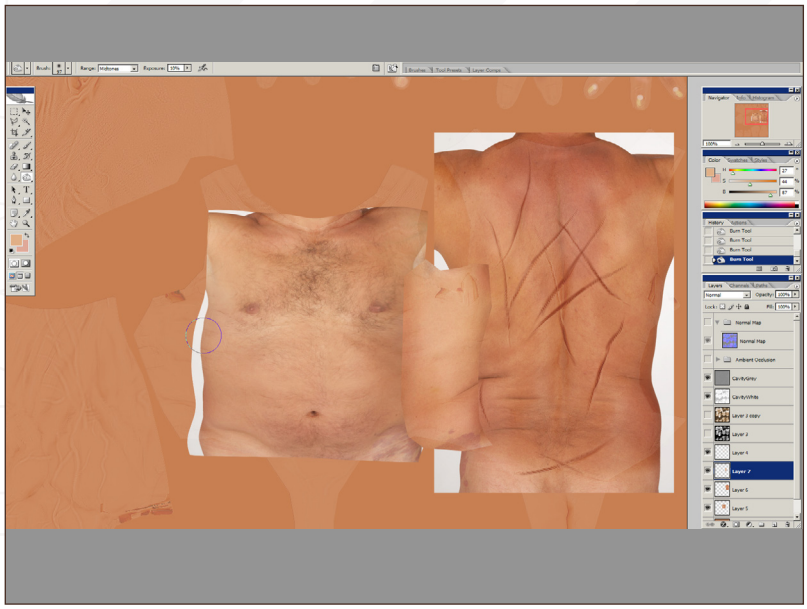


Fig 29

28. Move onto the back of the character now and paint red into the large slashes on his back. Nothing too detailed, but again just to differentiate them from the skin color (**Fig.28**).

29. Hide the cavity and shading layers, and then import reference images of the front, back, and side of a male model. It doesn't really matter at this point if the man's skin tone or skin texture matches the concept as we will heavily edit it later. We just want a little bit of variation and color, and to give us a base to work from. Using the Marquee Selection Tool (M) select the chest of the reference image and drag it onto our texture. Do the same with a section of the side and back of our character (**Fig.29**).

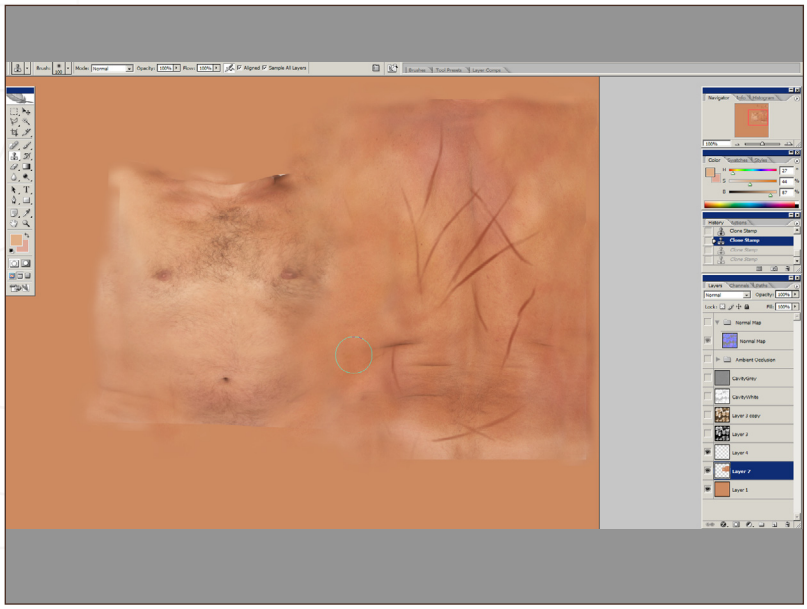


Fig 30

30. Using the Eraser tool (E), go around the outline of each reference picture erasing all of the white background and feathering the edges so they all blend in together. Once the images are roughly blended, select the top layer of the three and hit Ctrl + E twice, to merge these layers together (**Fig.30**).

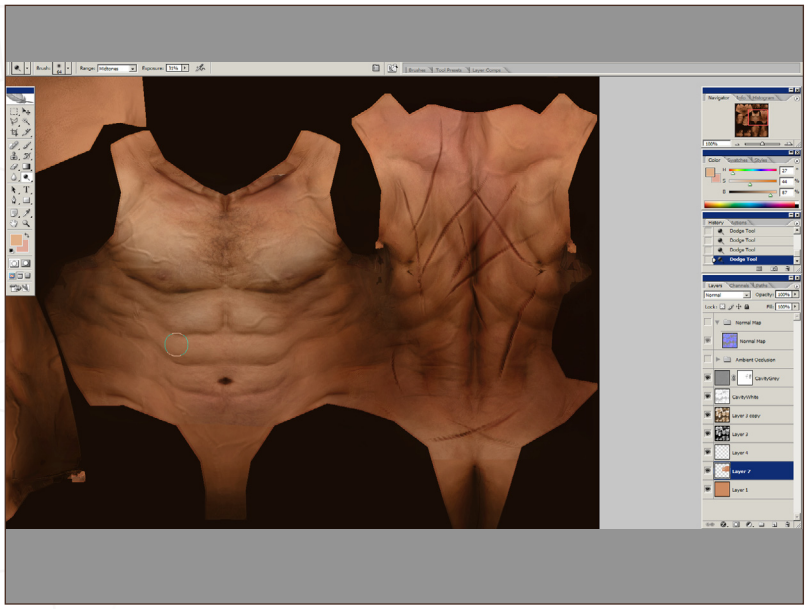
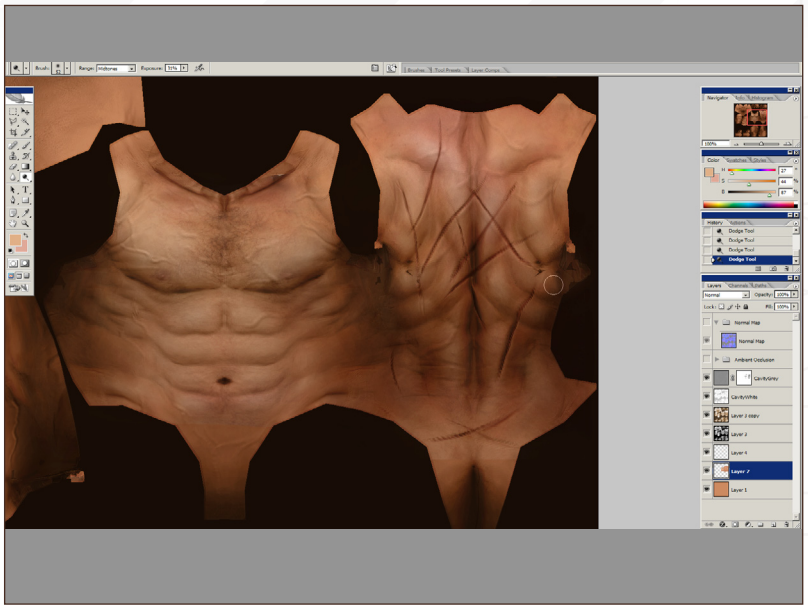


Fig 31

31. Now unhide the cavity and shading layers. We are going to work directly on the layer we just created from our reference photographs. We need to define the muscles now as we defined the hand earlier. Select the Dodge brush from the tool palette. The shortcut for Dodge and Burn is O, with Shift + O cycling through the Dodge, Burn, and Sponge tools. When Dodge or Burn is selected we have the option at the top of the screen to change the range. We can specify if the tool affects the midtones, shadow areas, or highlights of the image. For now, leave it on midtones. We'll use the Dodge brush to paint over areas where the muscle sticks out. This only needs to be done lightly to hint at a 3D effect, as any more and it will look too baked (**Fig.31**).

32. Now work on the back of the character in the same way. You can also use the Burn Tool to darken areas where muscles overlap or cast a small shadow. Again, be careful to not go too far (**Fig.32**).

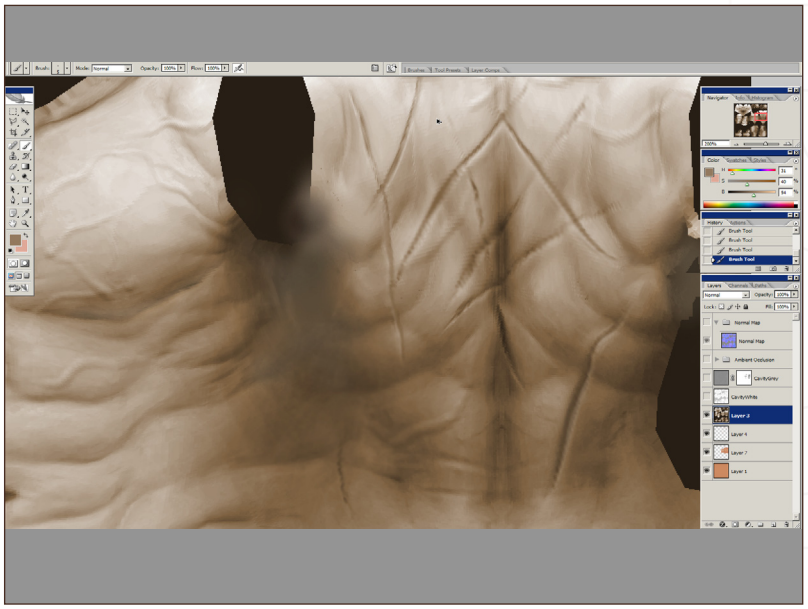
Fig 32



33. You can take this opportunity to do the same technique on the rest of the model, applying the same principles to the muscles on the legs, arms, neck, and feet.

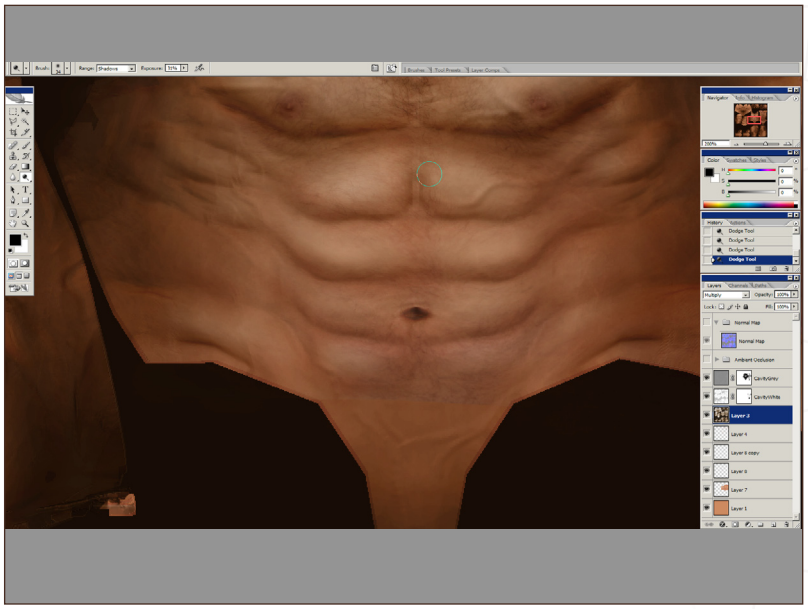
Hide the cavity layers and change the layer blending mode of the shading layer to normal. Some areas of this shading map are too dark and we need to lighten them up and fix any intersection errors that have occurred. Switch to the shading layer so we can work directly on it now. For example, under the arm there are a few areas that don't look clean and smooth. Use a combination of the paintbrush, sampling areas of color nearby by holding Alt + left-clicking, and the Dodge brush to lighten up darker areas (**Fig.33**).

Fig 33



34. Switch the layer blending mode back to Multiply and turn on the cavity layers again. Work in a little more detail now with the Dodge and Burn brushes and the paintbrush, sampling areas of color and accentuating the muscles and raised areas (**Fig.34a – b**).

Fig 34a



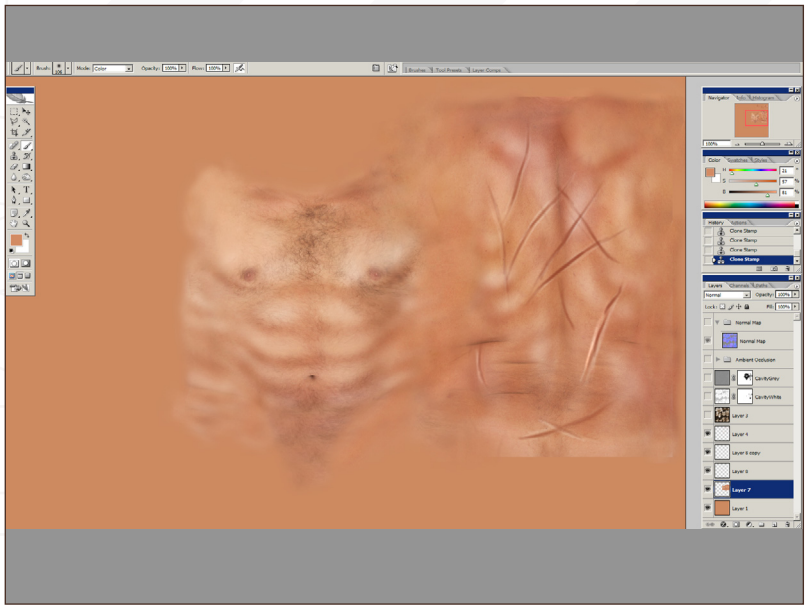


Fig 34b



Fig 35

35. Using more photo references now, find an image of a man's face that looks like it would work well for our character. He doesn't have to be ape-like; again we just need a little bit of color variation and natural detail. Cut out just the face section and paste it directly above our photo reference layer (**Fig.35**).



Fig 36

36. Now with that layer selected, go to Filter > Liquify. This will open the Liquify tool, which is great for quickly morphing around our images to fit onto a specific shape. Using the default Liquify brush, with a brush size of around 200, move the image around to fit. You will notice that even though you're moving it around, it's still visible in its original form. At the bottom of the menu on the right, click on the drop-down menu and select the shading layer. Make sure Show Backdrop is enabled and the opacity setting is around 60 (**Fig.36**).

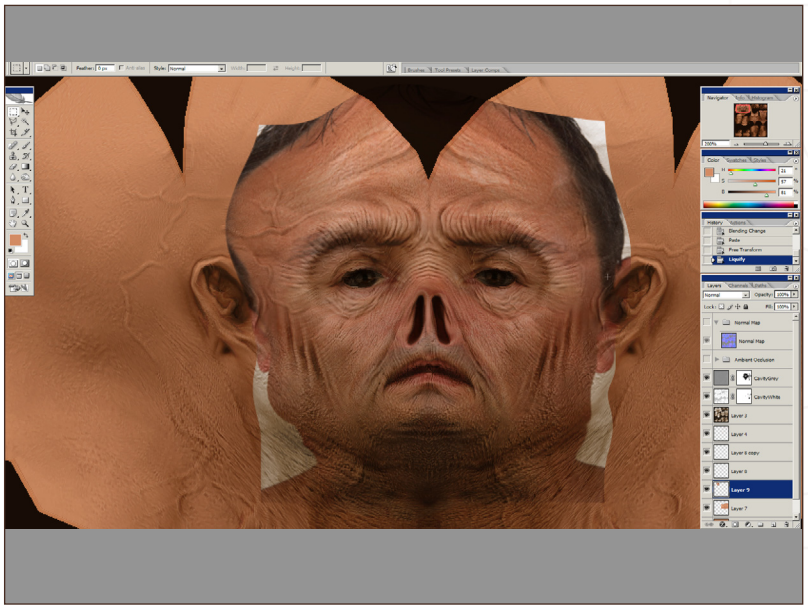
37. Now when we morph our image we will be able to morph it around directly and match it up with the underlying shading layer. Liquify the image now to fit, altering the brush size up and down when necessary (**Fig.37**).

Fig 37



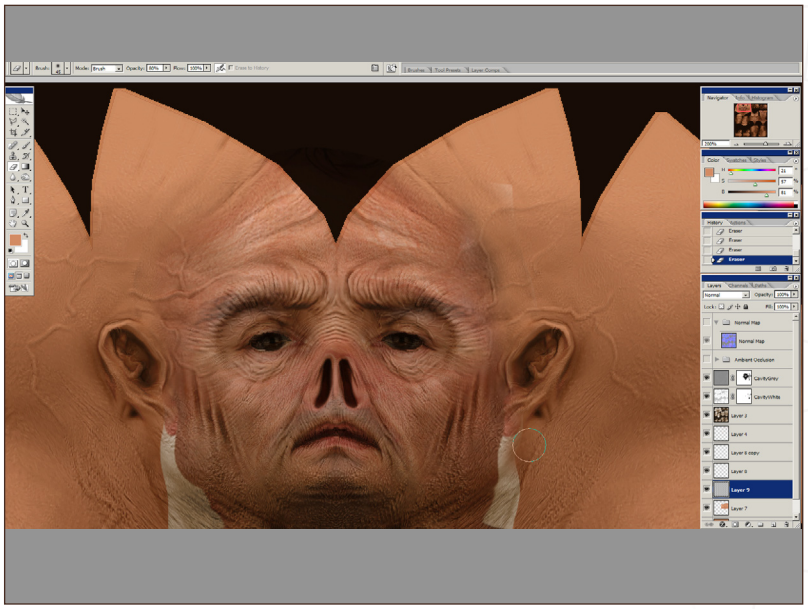
38. Commit to our Liquify by clicking OK (**Fig.38**).

Fig 38



39. Carefully use the Eraser Tool to get rid of all the white space and fade the texture into the base color (**Fig.39a – b**).

Fig 39a



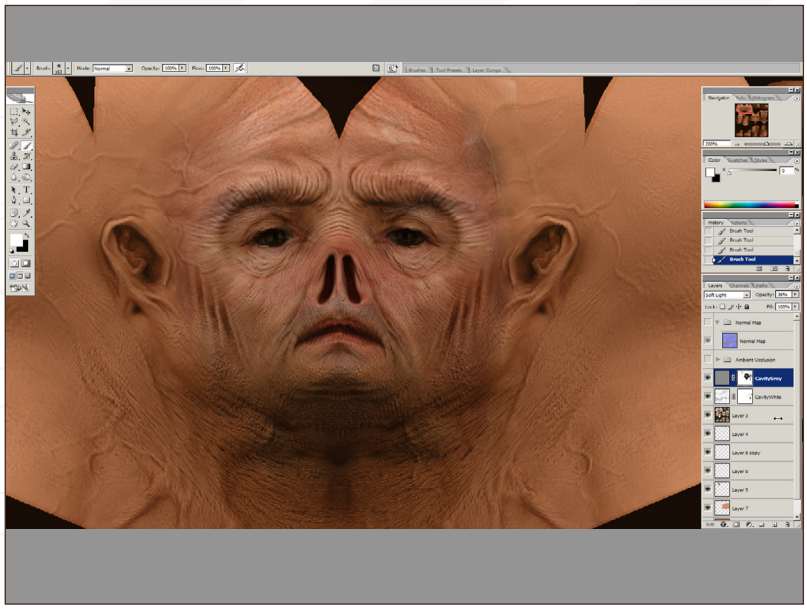


Fig 39b

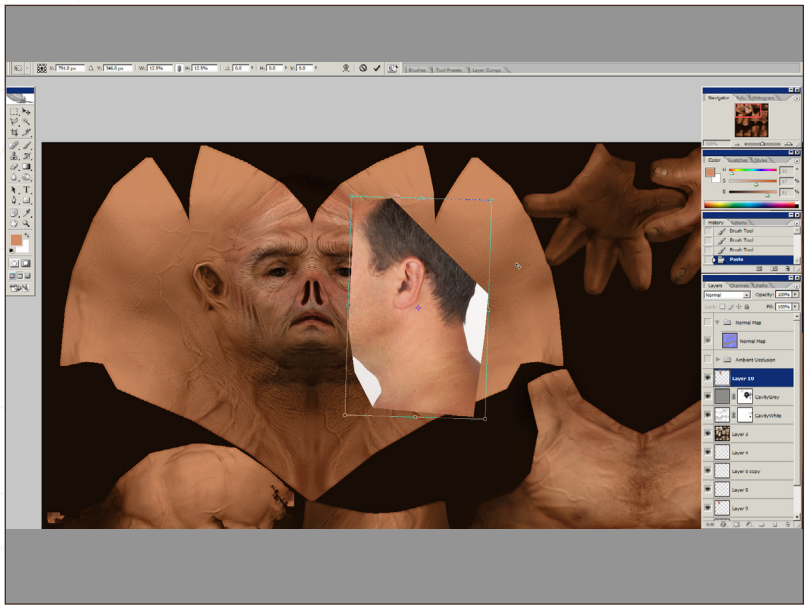


Fig 40

40. Now import pictures of the side of a man's head and paste onto a new layer. Using the Transform tools, Ctrl + Alt + T, rotate and scale the image into place (**Fig.40**).

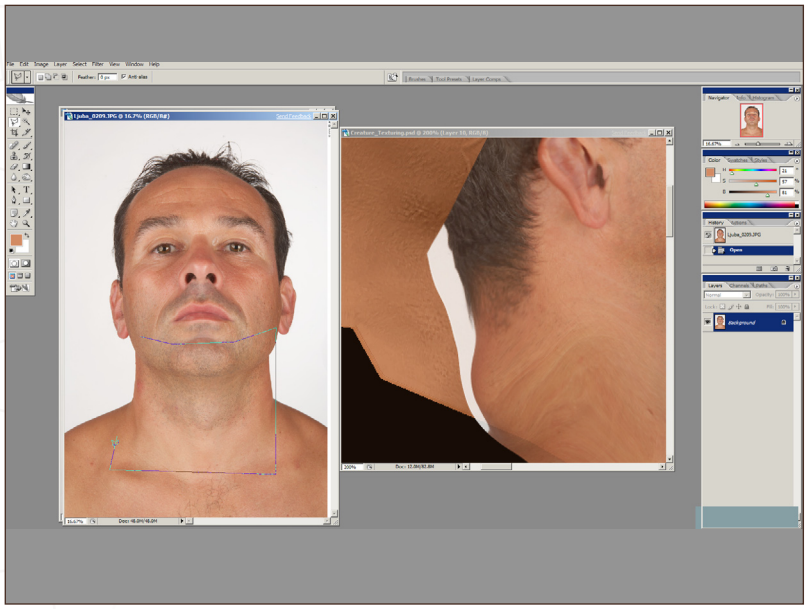


Fig 41a

41. Use the Liquify tool again to match the ear as close as possible with the shading layer. You can duplicate that layer and go to Edit > Transform > Flip Horizontal and move it over to quickly create the opposite side of the head.

Now, using reference of the chin and neck, paste that in place also and use the Eraser tool to blend it with the other textures and then merge the layers together (**Fig.41a – c**).

Fig 41b

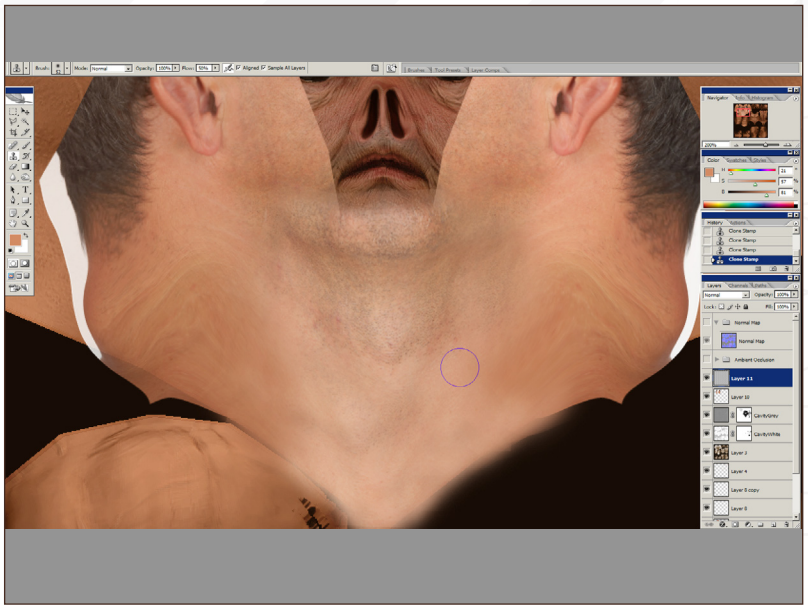
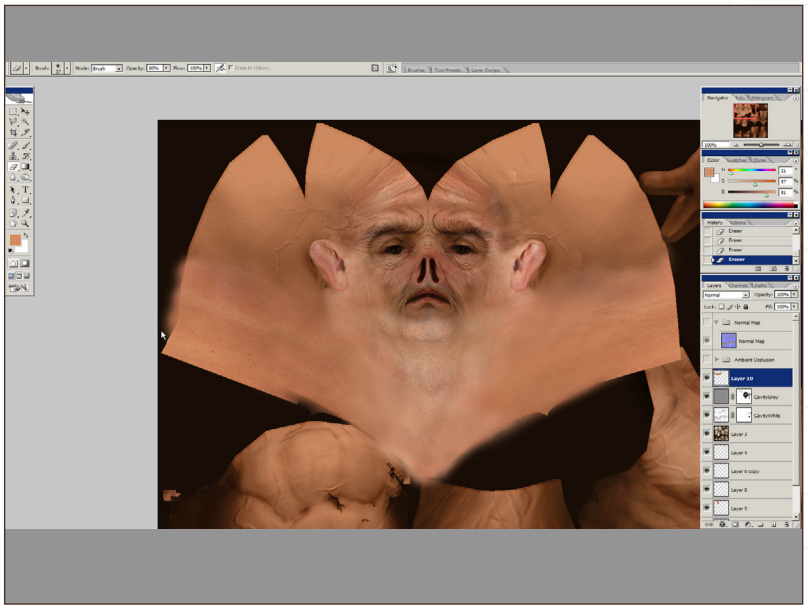


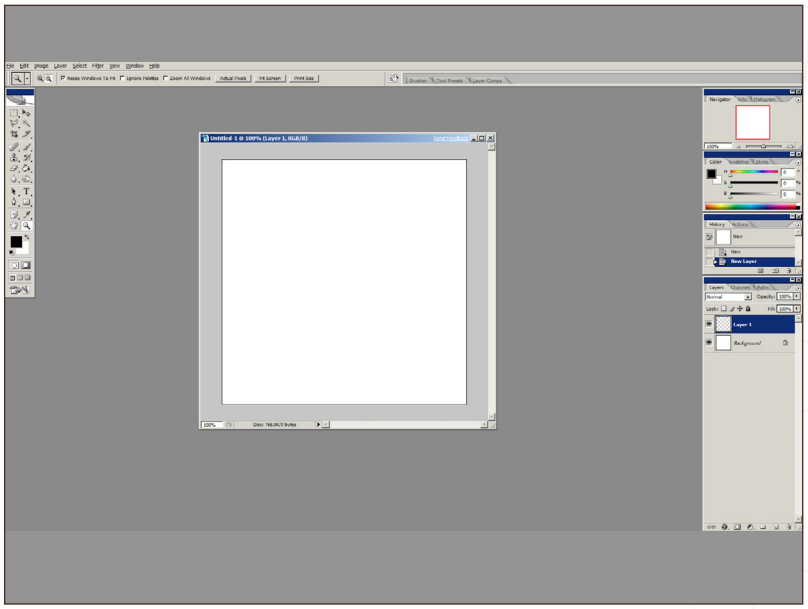
Fig 41c



42. Use the Burn Tool in either Midtones or Highlights mode to darken the chin and neck areas and any other darker parts to reduce the contrast between the two images. Merge this layer with our other photo reference layer. Now we have a really strong base texture for the head with minimal effort. Our color information is coming from real skin, light and dark areas of detail coming from our cavity maps, shading coming from our ambient occlusion map, tinted to look more natural, and all of this detail is supported by our normal map. What used to take days now takes mere minutes. With refinement and patience we can continue this process and turn this into a realistic, efficient texture for our character.

Let's work on painting some hair onto our character. We should first create a hair brush so we don't have to paint each hair one by one. Start a new document by going to File > New and set the dimensions to 512 by 512 pixels (**Fig.42**).

Fig 42



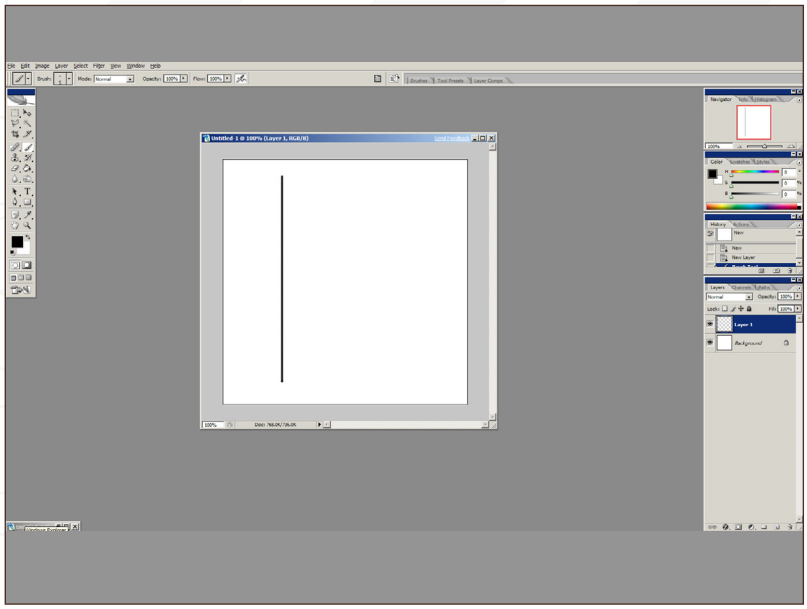


Fig 43

43. Now make a new layer and, using the Paintbrush (B), draw a vertical line from near the top to near the bottom (**Fig.43**).

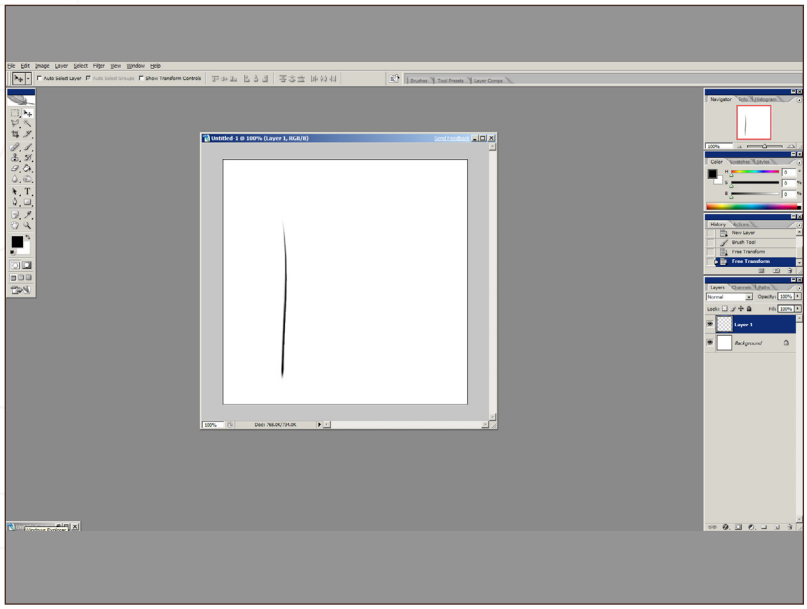


Fig 44

44. Using the Transform tool, Ctrl + Alt + T, scale the top of the line inward to be just a point. Hold down Ctrl + Shift + Alt and drag one of the top left or right control points inwards.

Without exiting the Transform tool, you'll notice that the top menu bar now has controls applicable to the active tool, currently the Free Transform tool. On the right-hand-side we have a tick and a cross to either commit to the transform or to revert to how it was before. Next to this there is a button to switch to Warp mode. Warp essentially lets you bend and shape the current image using a small number of control points. Use these control points to give a little variation and bend to our line (**Fig.44**).

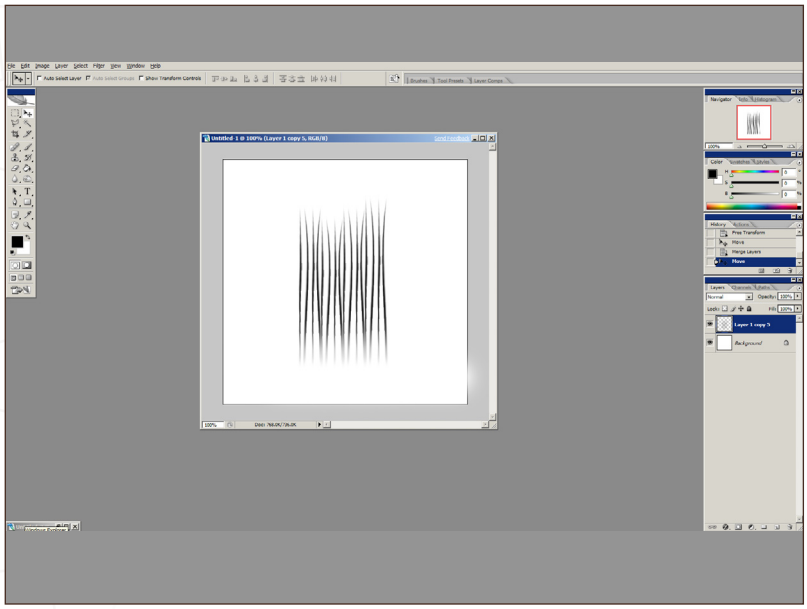
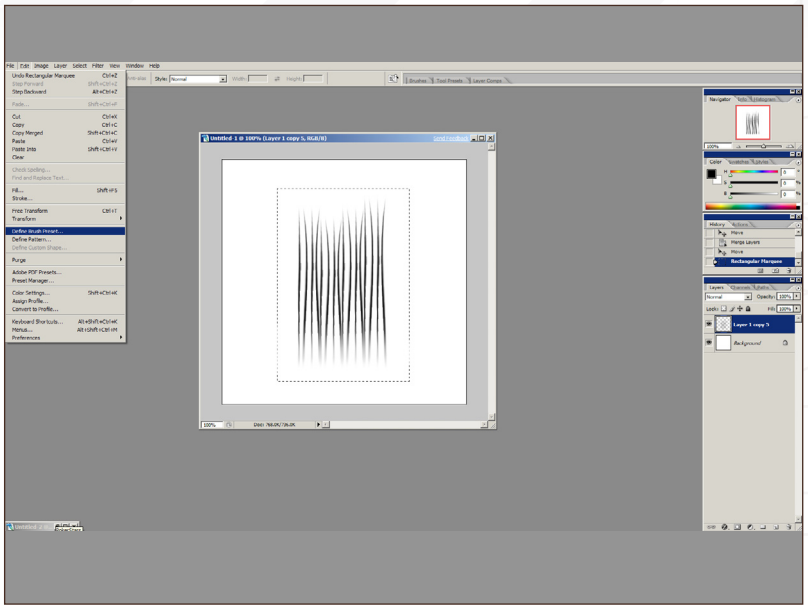


Fig 45

45. Now, using the Move tool (V), hold down Alt + Shift and drag your line to the side. Enable the Free Transform by hitting Ctrl + Alt + T and scale and warp the line slightly for further variation. Go ahead and duplicate the line in this way several times. We're looking for between 8 and 16 lines that we will use for hairs. Now, using the Eraser Tool, rub out a little of the bottom section of hair so there are no hard lines (**Fig.45**).

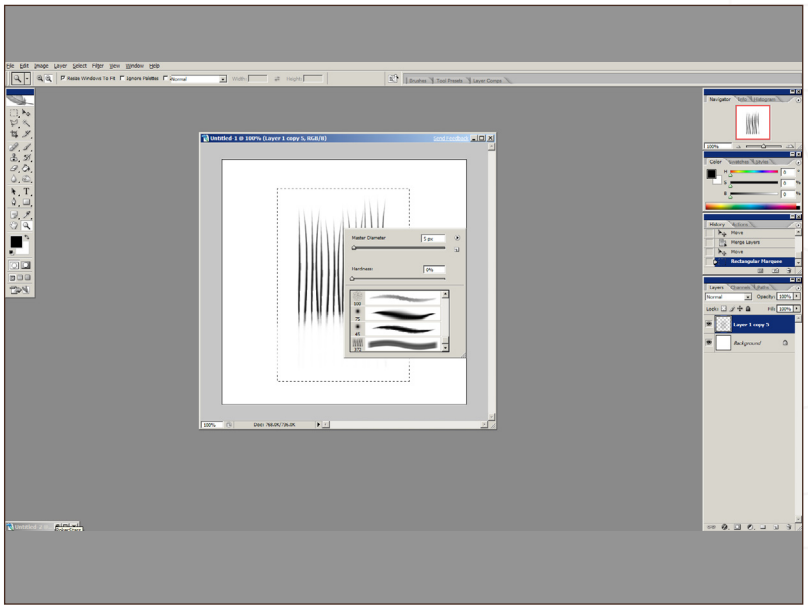
46. Drag a Rectangular Marquee Tool around the hair and go to Edit > Define Brush Preset. Make sure the layer you create your brush on has either a white or transparent background. That way, when we later paint our hair, we will be painting unique hairs onto the layer and therefore be able to extract an alpha channel which we can use for opacity in our 3D application to make the hair look realistic (**Fig.46**).

Fig 46



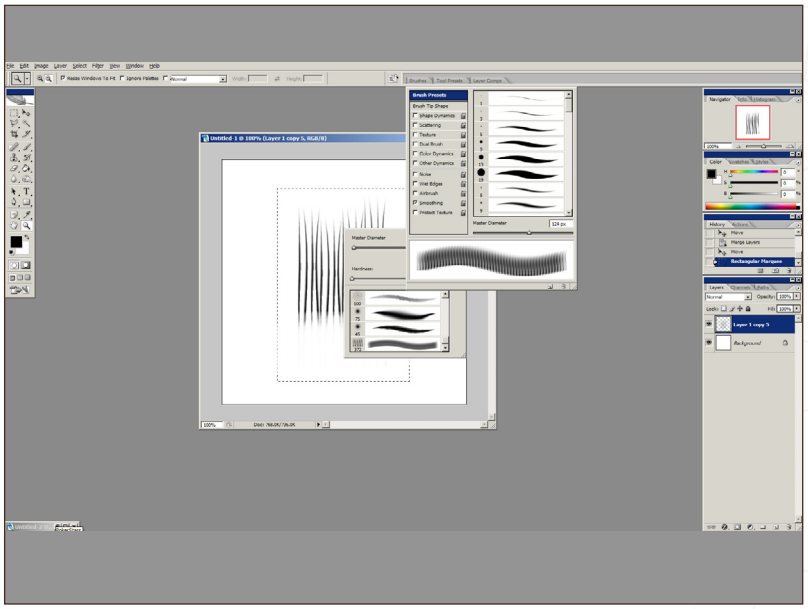
47. Commit to the brush preset and then right-click over your image. Scroll down the menu until you get to the very last brush, which will be the one we just created (**Fig.47**).

Fig 47



48. In the upper right of the screen there's a brush menu where we will edit the brush settings (**Fig.48**).

Fig 48



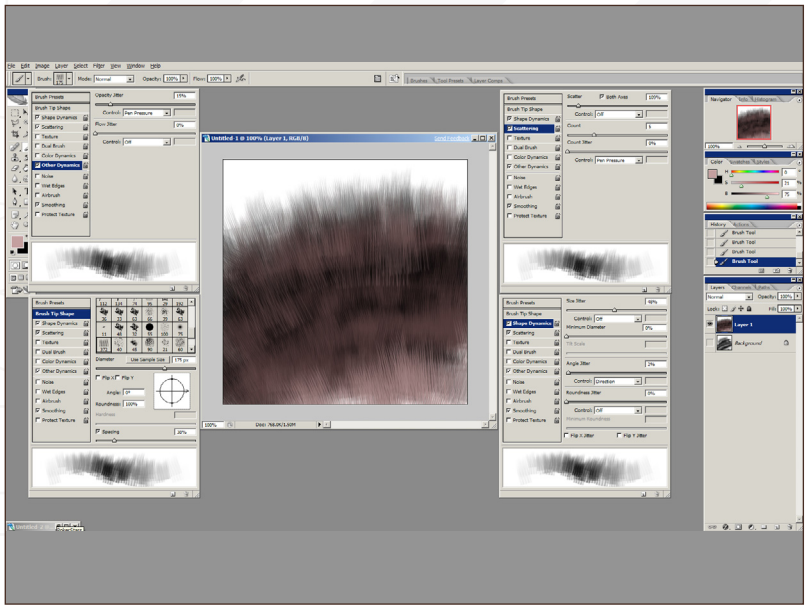


Fig 49

49. It is important here to make sure the brush has an organic feel to it by varying the opacity, size and angles. Copy the brush settings in the screenshot and try out your brush on the canvas. The important settings are under Shape Dynamics > Angle Jitter. We can change the Control to Direction so we have more control over how our hair is spread on the character. Optionally, we can also use the Color Dynamics to add variation in the hue and saturation, which will help immensely in quickly creating unique, natural, and believable results. We will also use Scattering to add multiple brushstrokes at once to build up hair much more quickly (**Fig.49**).

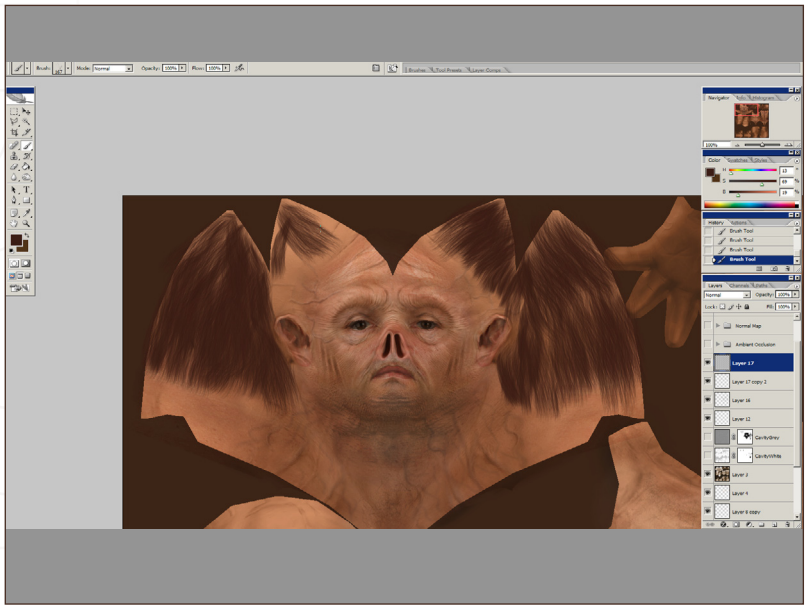


Fig 50a

50. The brush that we just created can be very useful for creating short animal fur. Try creating some new brushes in the same way but with a longer sample of hair, or with wispy, curly strands.

On a new layer, use the hair brush to paint basic hair onto the head of our character. Use a dark color to simulate shadow, and as we paint more on top we will get lighter in our color choices to give the hair depth. We will supplement this later with opacity-mapped hair planes to make the hair more 3-dimensional (**Fig.50a – b**).

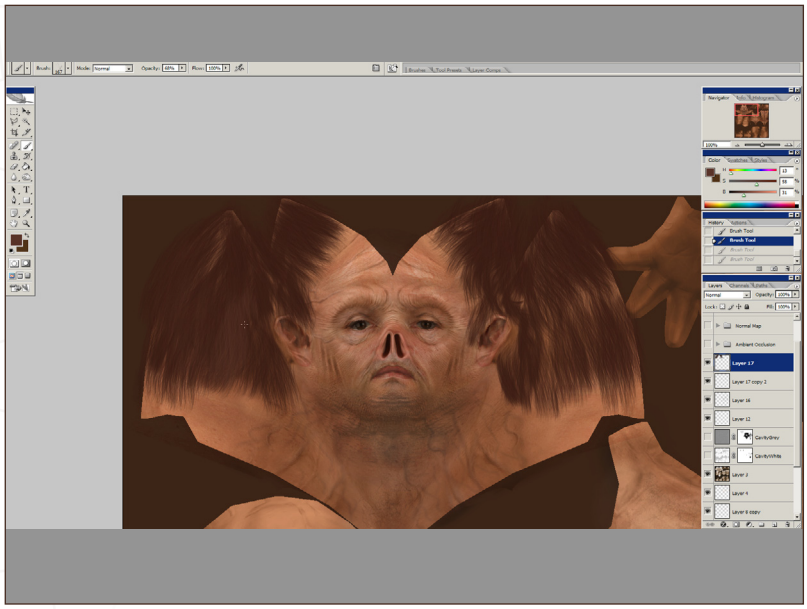
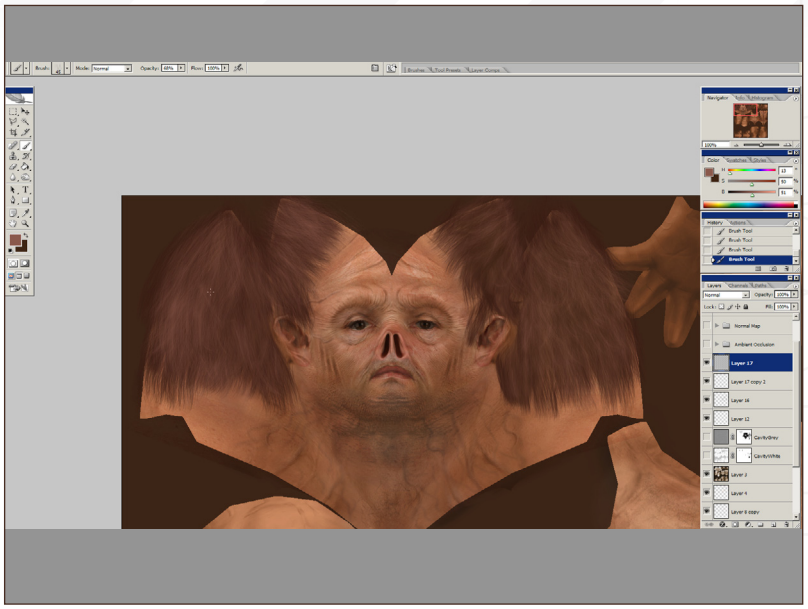


Fig 50b

51. Now add a lighter color on top and start to paint wispy hairs. Using the Burn Tool, darken the whole hair layer a little bit (**Fig.51**).

Fig 51



52. Moving onto the rest of the body, create new hair brushes that are composed of smaller, thinner hairs and make sure the scattering and spacing allow for a much lower density of hair placement.

Paint hair on the tops of the hands, palms, chest, back, arms, and legs. This kind of hair is thinner and wispier than the head and leg fur, and should remain quite light, darkening in areas where it would be thicker such as underneath the armpits and in the centre of the chest (**Fig.52a – b**).

Fig 52a

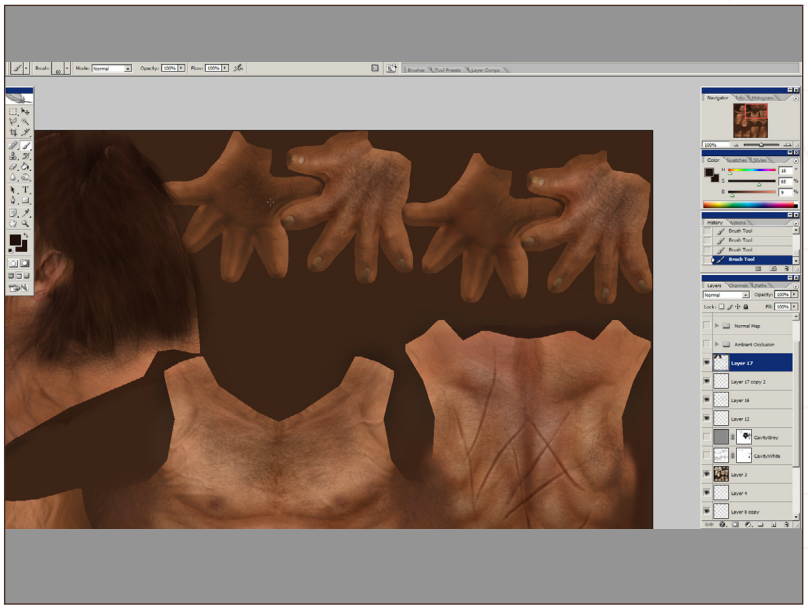
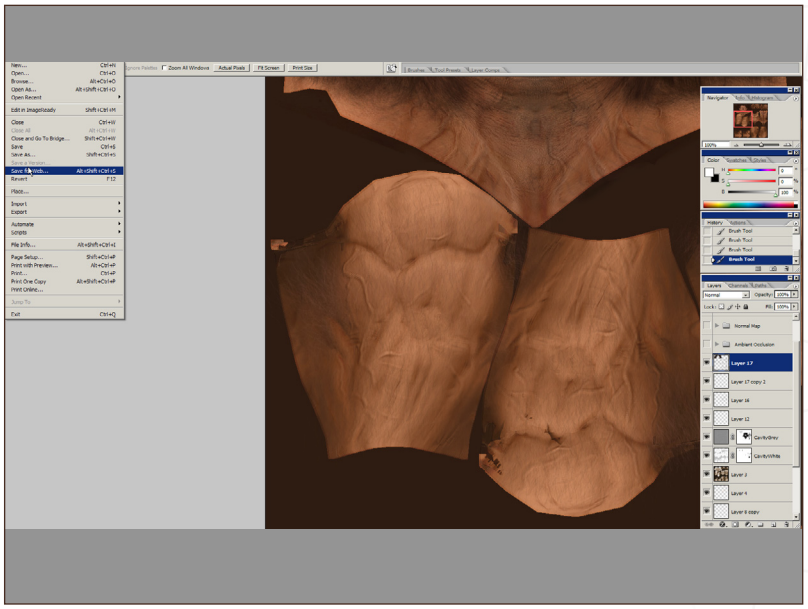


Fig 52b



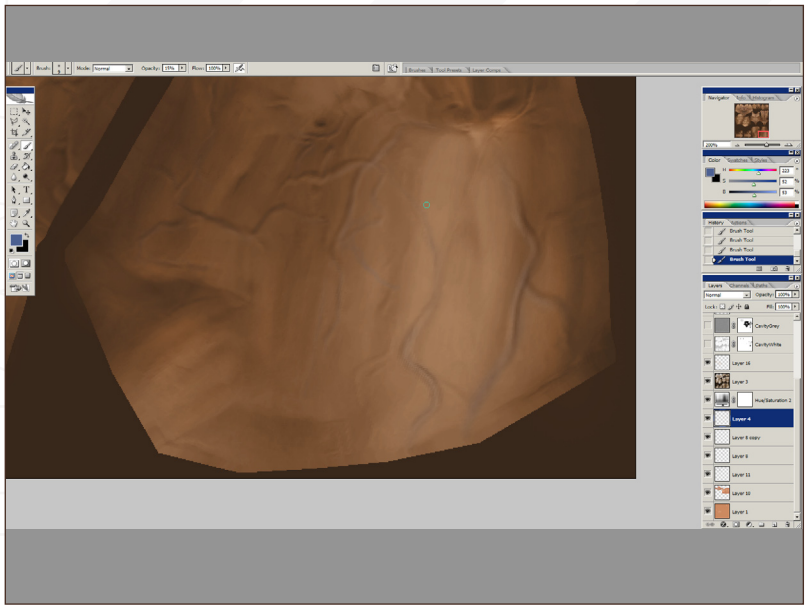


Fig 53

53. You can even create a brush of large curls that add to the underarms and crotch area to depict thicker hair.

On a new layer below the shading layer, pick a bluish purple color from the color swatches and lightly paint over the veins in the body. The blue color simulates a little depth to the veins, even though they are sticking out of our model in the normal map (**Fig.53**).

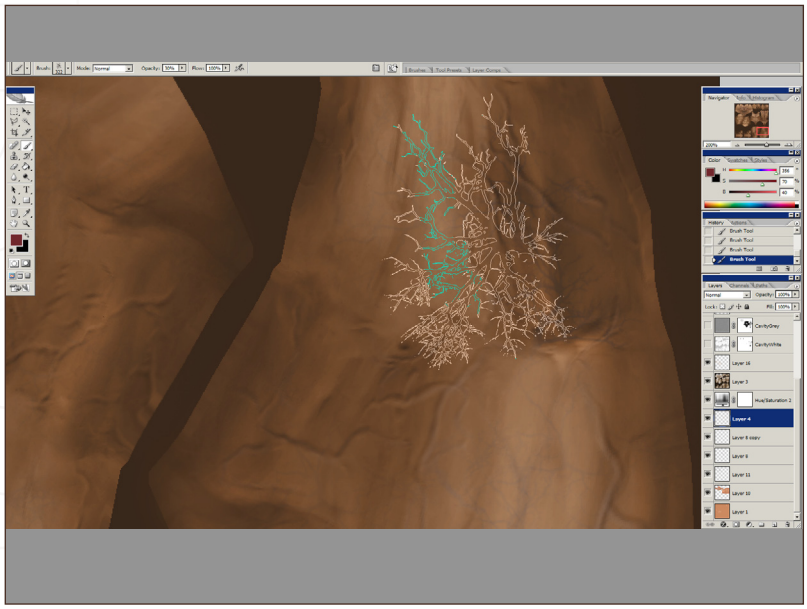


Fig 54

54. Search online or create your own brushes that look like veins. There are plenty of vein brush collections for Photoshop online. You could paint your own, or create them from photographs (**Fig.54**).

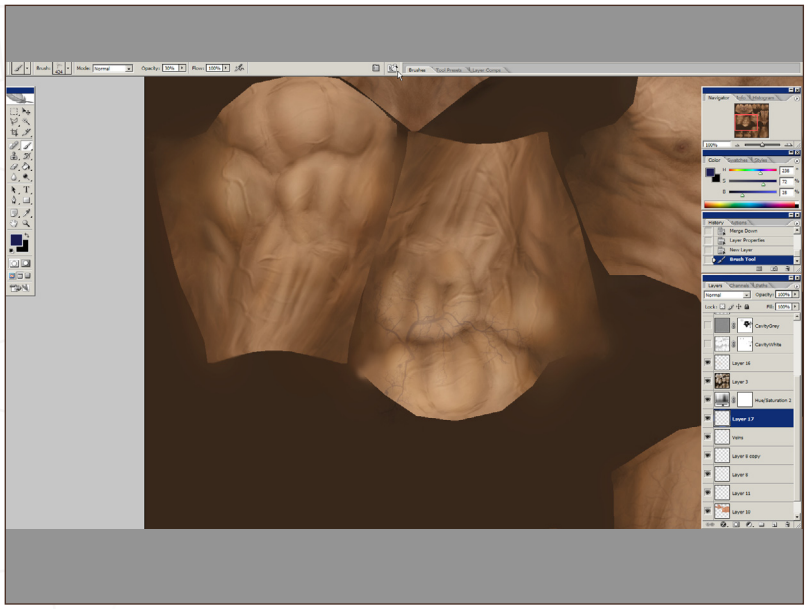
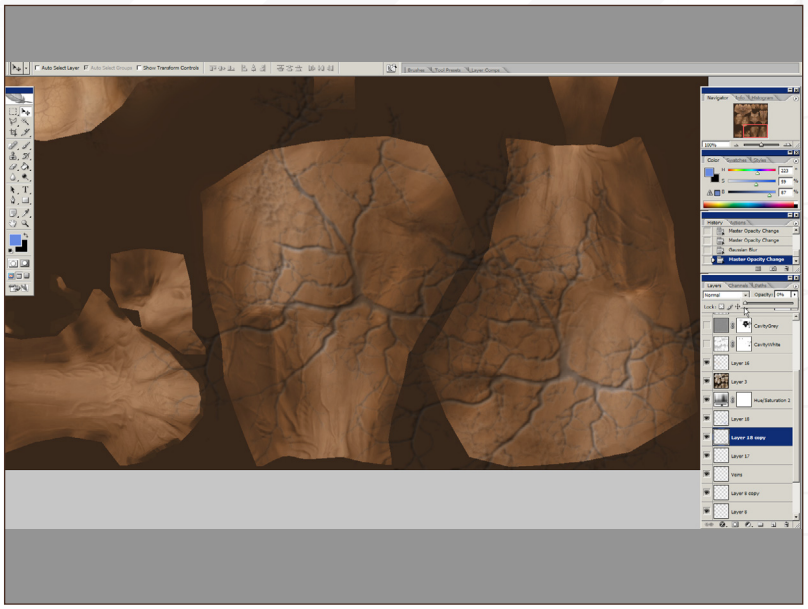


Fig 55

55. Apply this to the whole texture, creating veins wherever you feel the texture could use them. You can create mostly blue veins, but smaller red ones can offer variation (**Fig.55**).

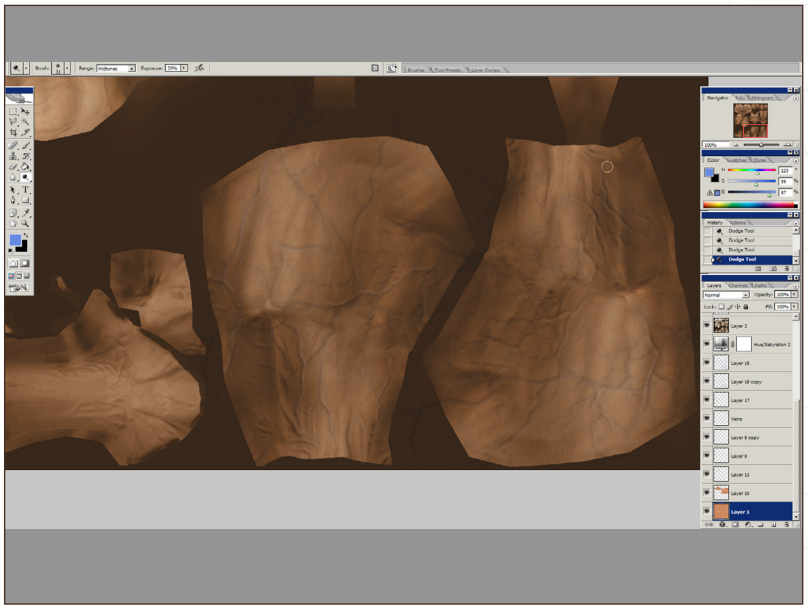
56. For some large veins on the arm, we can simulate depth by using the Emboss effect. Draw or use a brush to create a new vein on a new layer, and then go to Filter > Stylize > Emboss. Change the angle to 90 for top-down lighting, put the height around 10, and change the amount to 100 (**Fig.56**).

Fig 56



57. Now go to Filter > Blur > Gaussian Blur and give it a small value, enough to look like the example in the screenshot. Veins under the skin will not be sharp and pronounced, so the Gaussian Blur helps to set them under the surface. Reduce the layer opacity considerably to a value of between 5 and 8 (**Fig.57**).

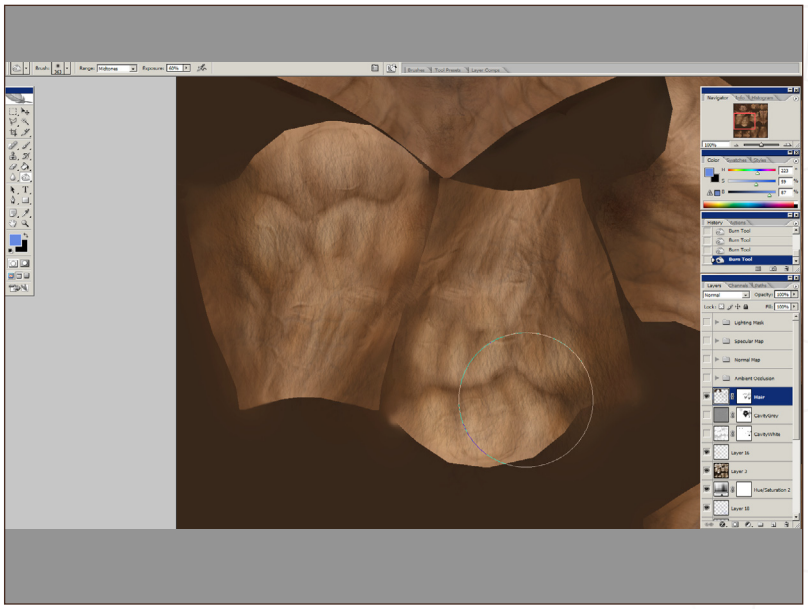
Fig 57



58. Try to keep things like hair, veins, fur, and scars on separate layers. There's always the possibility that you come into work the next day and the character has changed to a hairless lizard man. It's no good if you've baked all of your veins, hair, and fur into the base texture, as this will simply result in a complete redo of all of your work. Art directors change their minds a lot and we have to be ready for that, so working in a non-destructive way pre-empts any possible changes. It also allows us to show different variations of the character – with and without fur, hairy or smooth, with lizard-like or human-like skin, and with different color tones. Whenever possible, try to work in a non-destructive manner.

Find the layer that you painted the arm hair onto, and darken it using the Burn Tool. The arms on our character are a lot hairier than the chest and back. The forearms will be completely covered in hair by the end, so we need to suggest that in the upper arms before we paint the fur on the lower arms (**Fig.58**).

Fig 58



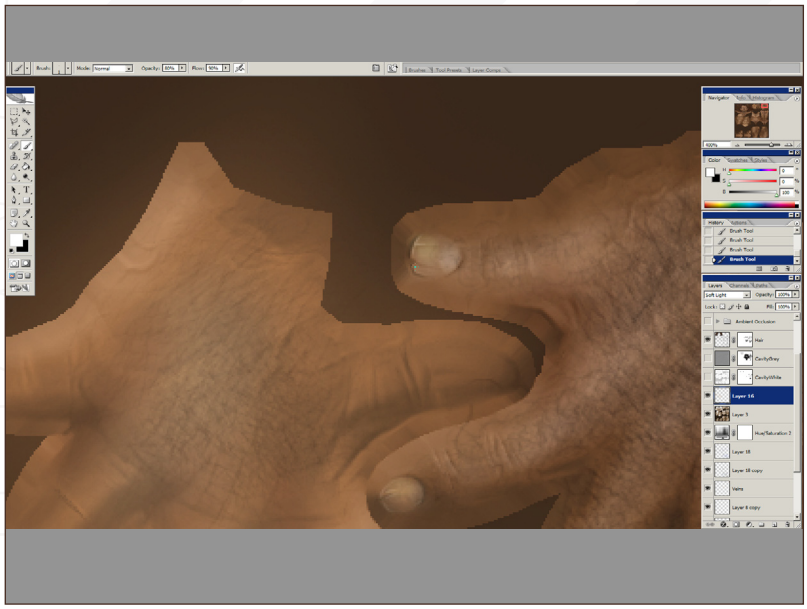


Fig 59

59. At this point take a small, light brush and paint in some small highlights where they would be on the model, for example on the edges of the fingernails and under the eyes (**Fig.59**).

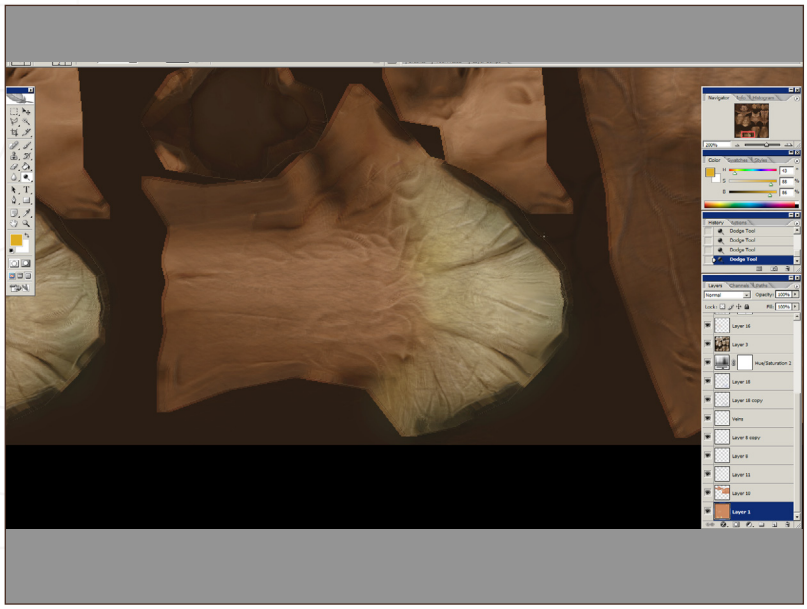


Fig 60

60. Move onto the feet now and in the base color paint a yellowish green for the hooves of the feet (**Fig.60**).

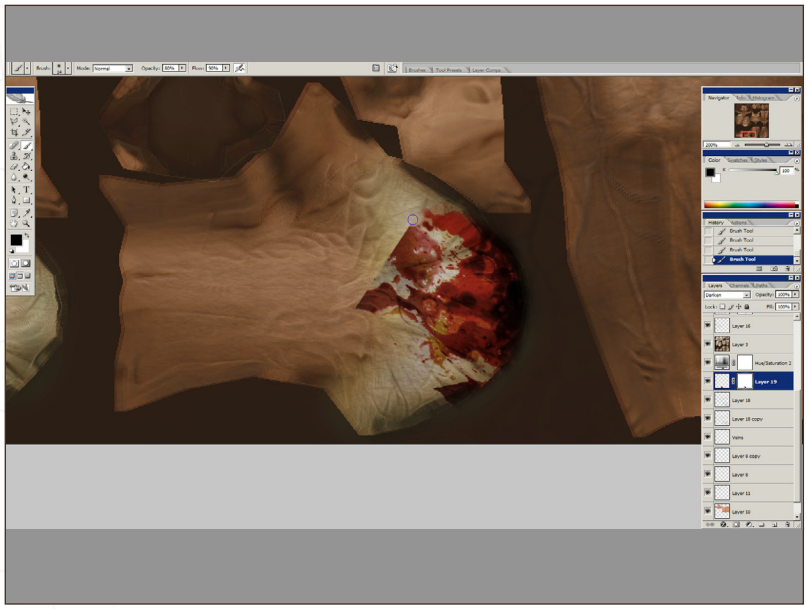
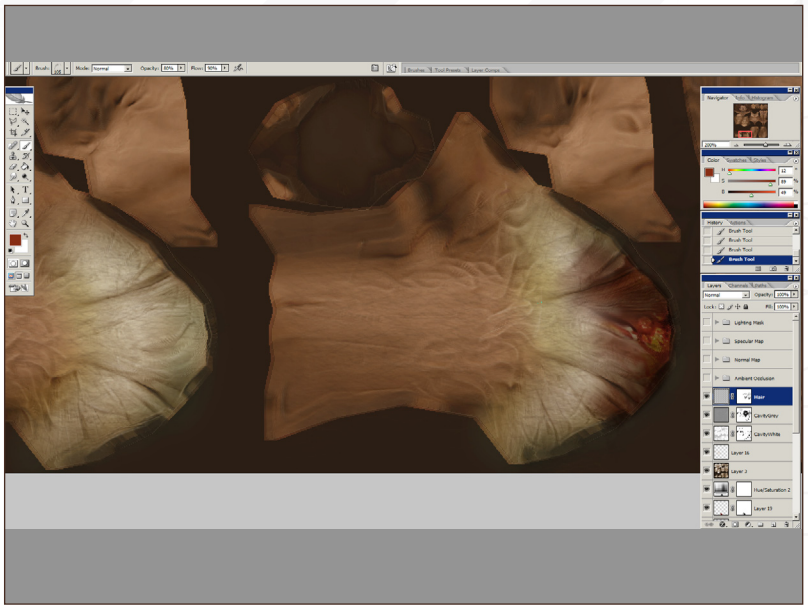


Fig 61

61. Find a picture of a blood splatter, paste it into the texture and set the layer mode to Darken. Erase any parts that might not fit and position it at the end of the foot. I want to add a little back story to the character, suggesting that in his escape he might have tripped and caught his foot on something or injured it somehow (**Fig.61**).

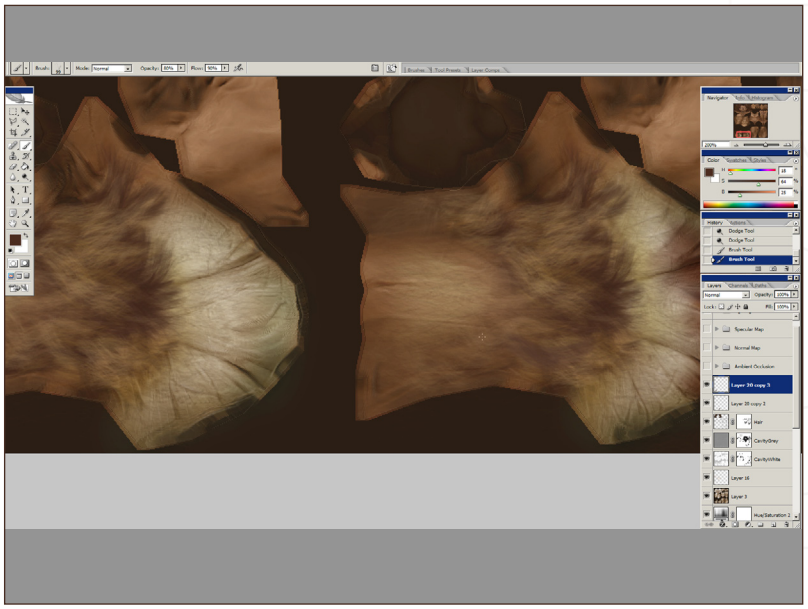
62. Position it correctly and blur around the sides of the blood splatter to make it look like the blood has soaked into the hoof, leaving one section looking like an open wound (**Fig.62**).

Fig 62



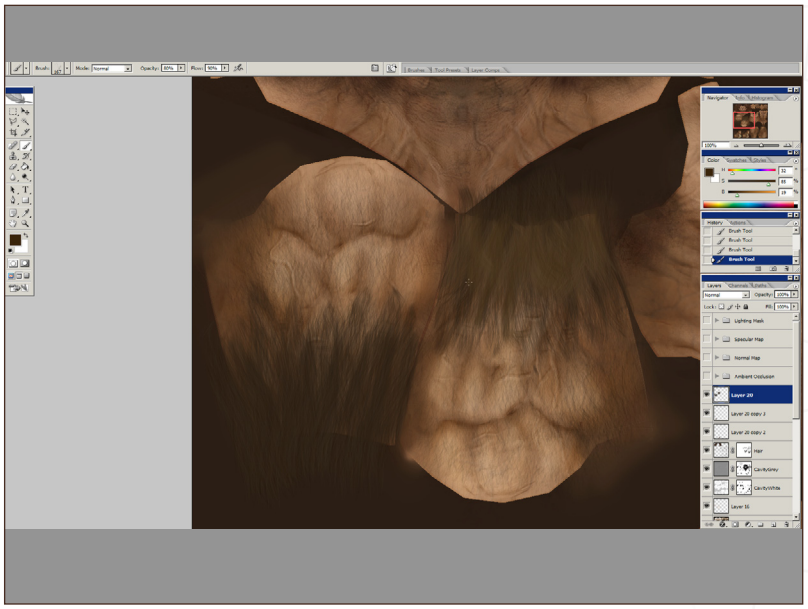
63. Staying with the feet, use the hair brushes we created to paint fur surrounding the transition between the shin and the hoof (**Fig.63**).

Fig 63



64. Paint hair in the same way on the forearms now (**Fig.64**).

Fig 64



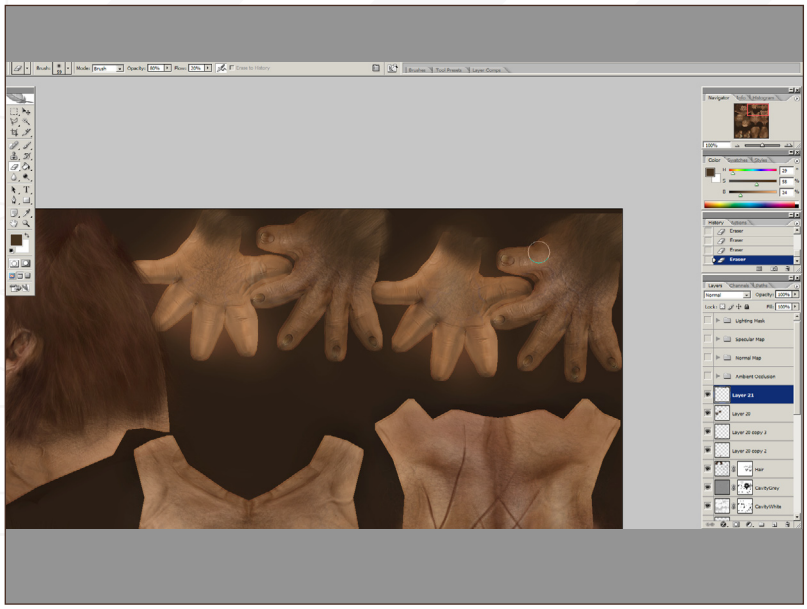


Fig 65

65. Remembering that the forearms join with the wrist, paint hair onto the front and back side of the hands near the wrist, so we can make sure that they match up (**Fig.65**).

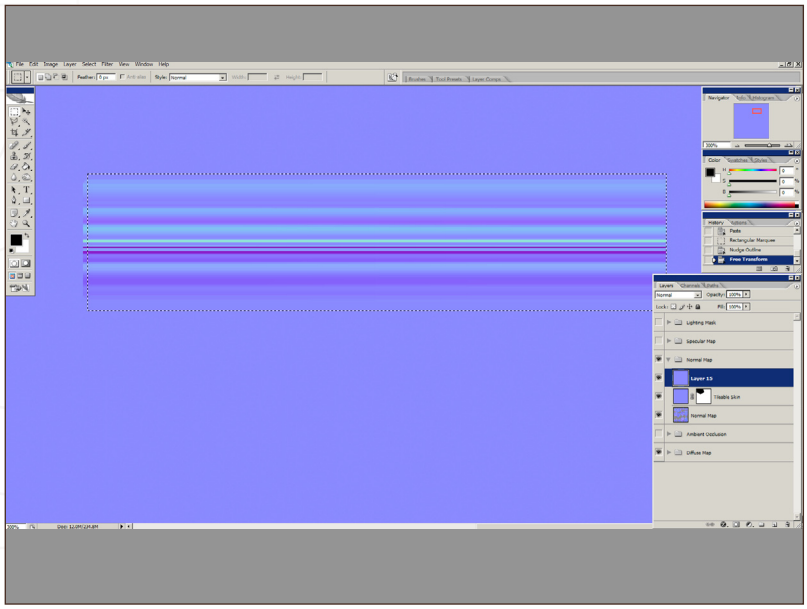


Fig 66

66. I've imported the normal map from the neck brace and dragged it onto our normal map section in place (**Fig.66**).

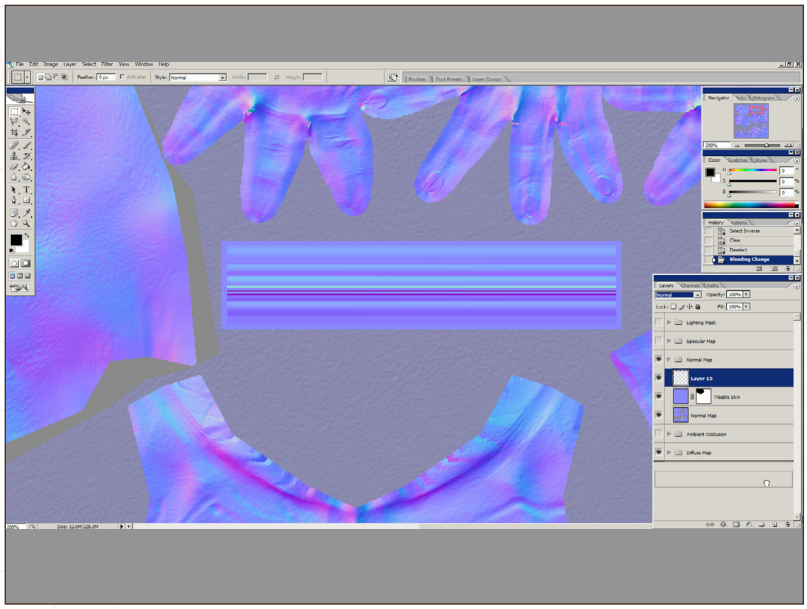


Fig 67

67. Make a Rectangular Marquee Selection around the object, invert the selection by hitting Ctrl + Alt + I, and then hit Delete to get rid of the excess texture. Duplicate the layer with the normal map of the neck brace and move it into the diffuse map. Desaturate this image by hitting Ctrl + Alt + U. Now darken it by going to Image > Adjust Brightness Contrast (**Fig.67**).

68. Back in the diffuse map, in the same area import an image that looks like metal scratches. I found this one at CGTextures.com, a free and expansive texture library that has almost any texture you could think of available. Again, make a Rectangular Marquee Selection around the area, invert it, and delete it to cut away the excess (**Fig.68a – b**).

Fig 68a

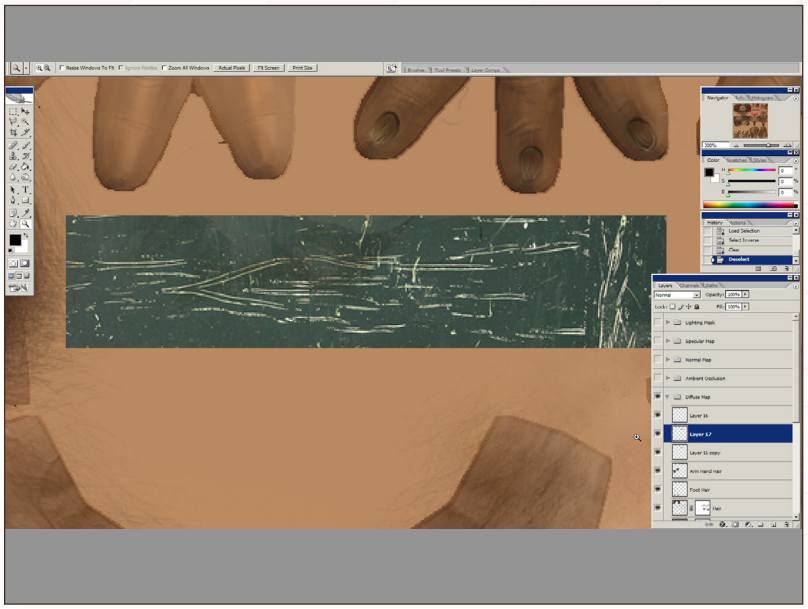
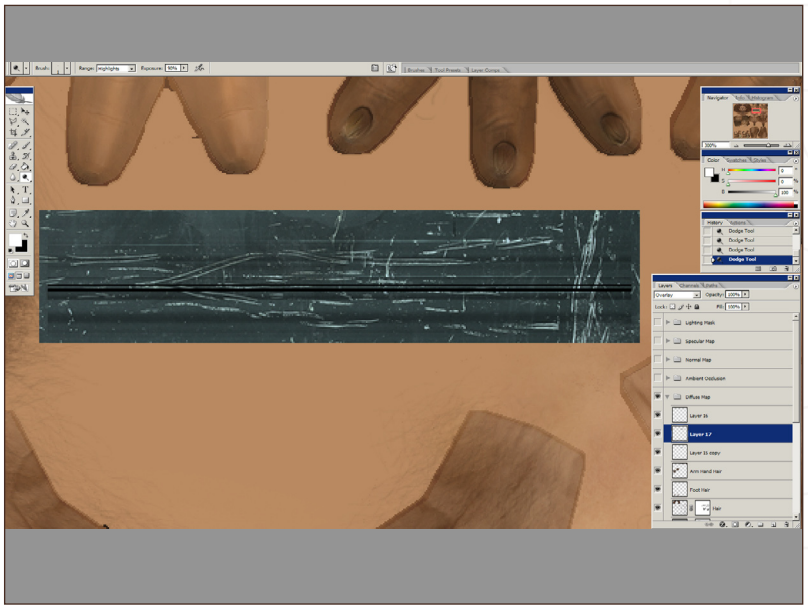


Fig 68b

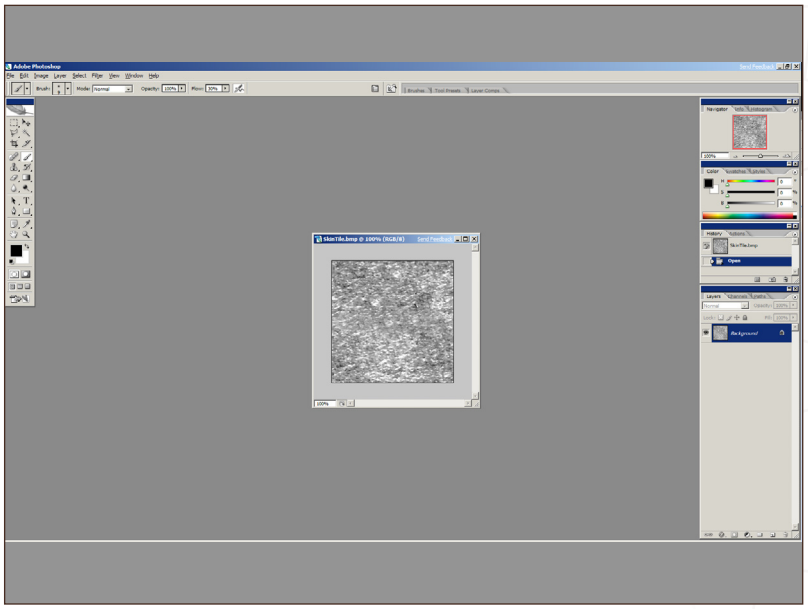


69. Let's move on to creating a tileable skin texture that we can overlay onto our normal map. Set the layer mode to Overlay. The normal map is very smooth in areas like the chest, back, and arms and we need to give those parts some detail. A good way to do that is to take the specular map and turn it into a normal map. With a low opacity this can yield some good results, but it's not perfect, as the normal map can have a single depth look and appear too pasted on. Another alternative is to use a tileable texture, either in the normal map directly or in the shader.

To create a tileable normal map, we start off with a grayscale image of skin. You can get this from anywhere you like or paint it yourself. There are many good sources that can be used for skin images, such as oranges, elephants, rhinos or our own bodies.

Create a new document with the height and width of 256 by 256 pixels and fill it with a section of skin from your chosen reference material. Remove the color information by hitting Ctrl + Alt + U. This is a normal map that we're creating so it needs to be created from a grayscale map, which essentially works as a height map. As this is going to be tiled across the body we have to make sure that when we do tile it there are no visible seams (**Fig.69**).

Fig 69



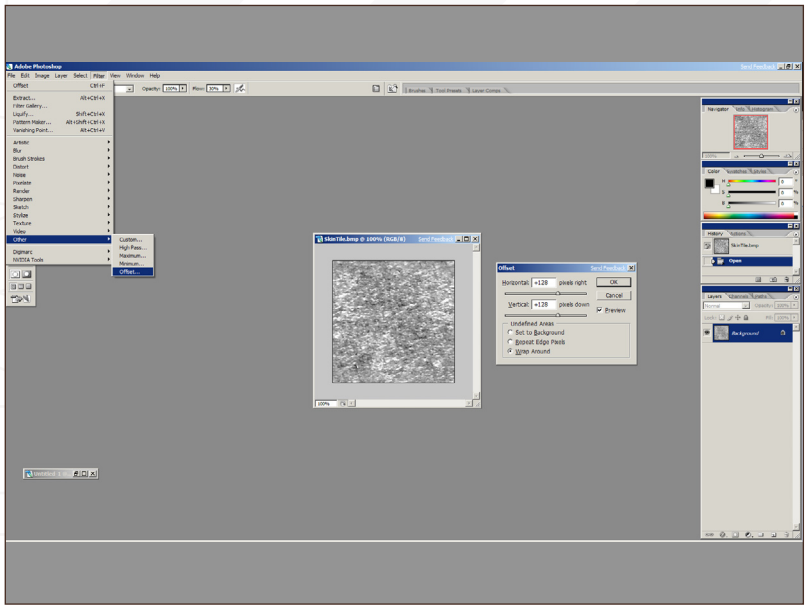


Fig 70

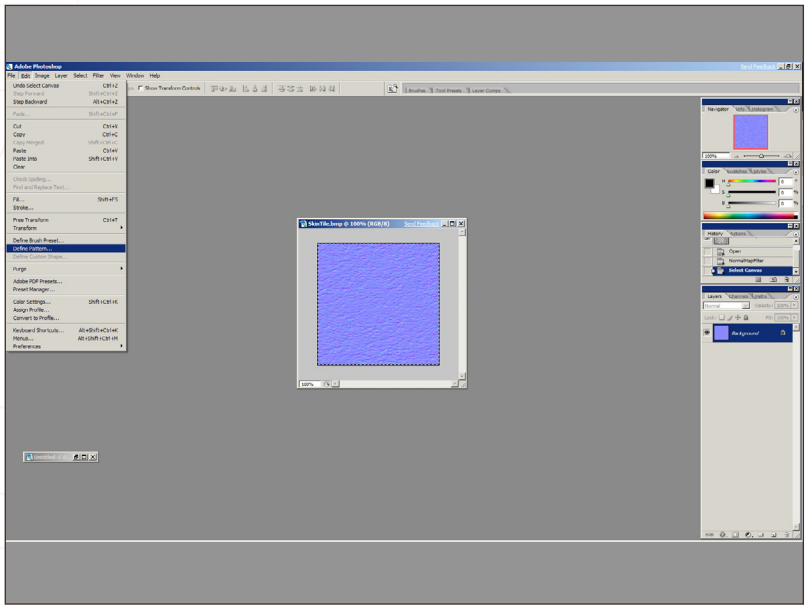


Fig 71

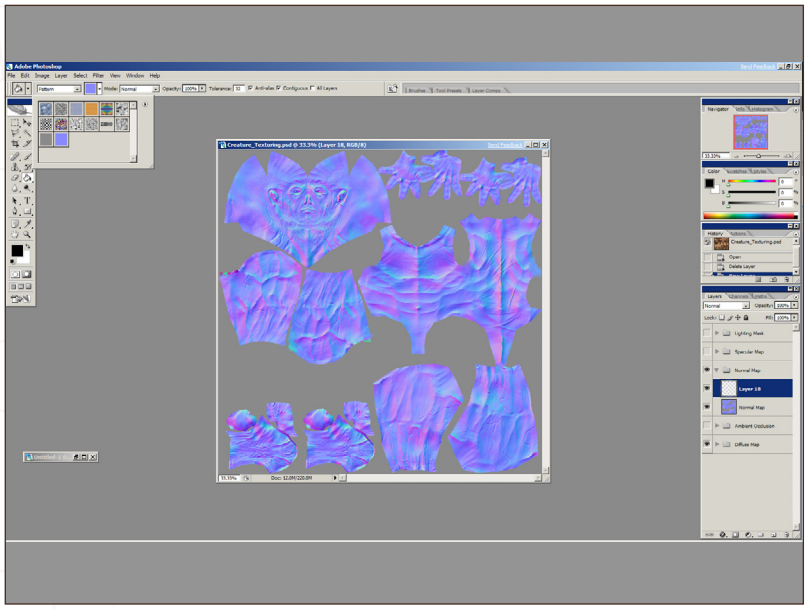


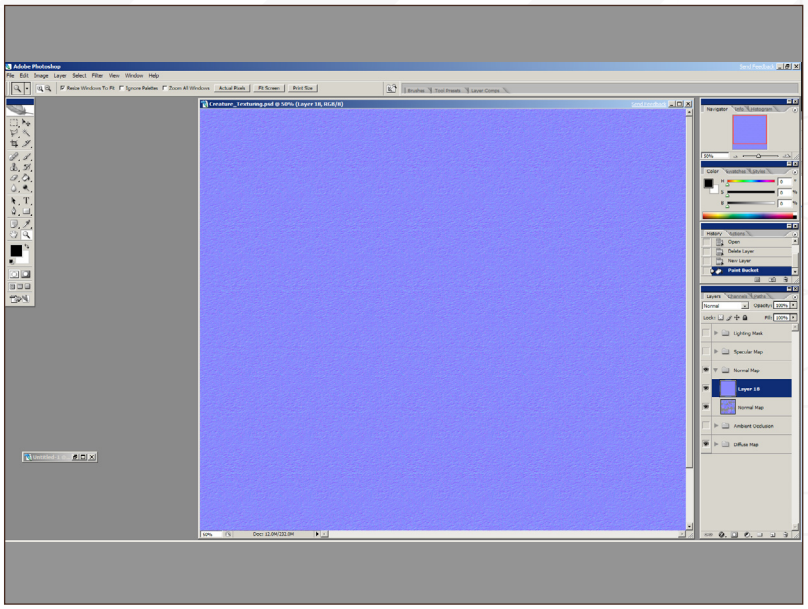
Fig 72

70. To do this, go to the Filter menu and under Other, select Offset. Type in a value of 128 into the horizontal box, and 128 into the vertical box, and then click OK. After we've applied the offset our texture will now be shifted 128 pixels to the right and 128 pixels down. We need to make sure that there are no seams visible here. If your texture is not tileable, you should see four distinct squares. Using the Clone Stamp Tool, the shortcut being S, clone various sections of this texture, or another grayscale skin texture, by Alt + clicking on a location you want to copy, and then painting on the location you want to copy to. Try to use a hard brush most of the time so the texture does not become dirty, which is a danger of using the Clone Tool excessively when using a soft brush. Keep on doing this until no distinct squares are visible. Try also to eliminate any major details or dark spots that might obviously stick out when the texture is tiled multiple times. Apply the offset one more time to check if your texture is truly seamless. If it is, you should not see any visible errors in the texture. It's important that our textures are tileable, as that way we can decide how small or large we want the detail to be (**Fig.70**).

71. As we're working with Photoshop and we want to create normal maps and save DDS files, we should download the Nvidia DDS tools for Photoshop, available from Nvidia's website (http://www.nvidia.com/). Once the Nvidia tools are installed you will be able to save and load DDS files from the File Open and Save dialogue boxes. You will also be able to access the Filter Nvidia tools menu where you can calculate and export normal maps. Click now on Filter > Nvidia > Tools > Normal Map Filter; this takes us to the Nvidia normal maps window where we can alter settings to give us different types of normal maps. The default settings should suffice for this skin tile, with the modification of changing the filter type from four samples to 3 x 3, which will give us a softer normal map. Click OK and let the Nvidia tools create our normal map for us. Now Select All to select our entire normal map and go to Edit > Define Pattern (**Fig.71**).

72. Open up our creature texturing file and create a new group called Normal Map. Put our creature's normal map inside of this group. Create a new layer above it and paste in our skin tile. The easiest way to do so is to go to the Paint Bucket Tool Shift + G, and change the mode to Pattern in the tool specific menu. It may be on pattern already, but chances are it will be on Foreground (**Fig.72**).

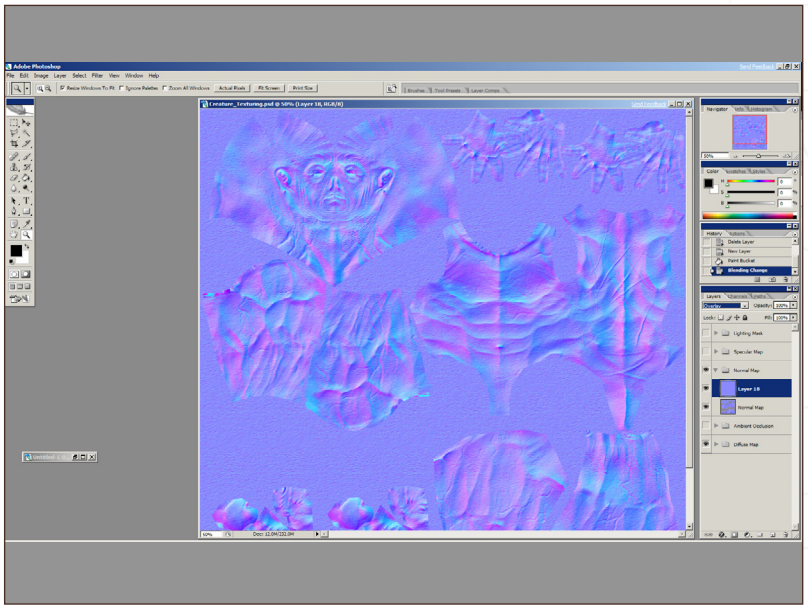
Fig 73



73. Click once over the image and it will be filled with our skin tile. As we created ours at 256 by 256 it is already the correct size for us and needs no modification (**Fig.73**).

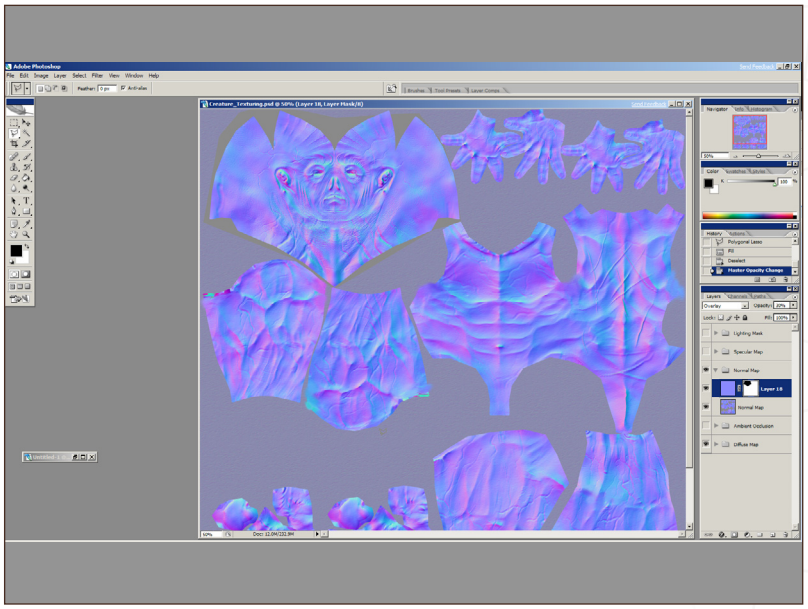
74. We can now simply set the layer mode to Overlay, our normal map now being visible through the obviously too strong skin tile (**Fig.74**).

Fig 74



75. Reduce the Opacity to around 30%. This should be visible from a distance, but not look too over the top up close. You should also create a layer mask by selecting the layer and clicking the third button from the left at the bottom of the layers window; the button looks like a small white circle in a grey square. The mask is created completely white by default, the layer being 100% visible. Select an area around the head of the character and fill it with black to mask the skin tile off in this area. The head is already quite detailed and we don't need any more in there, or else it will just become messy **(Fig.75**).

Fig 75



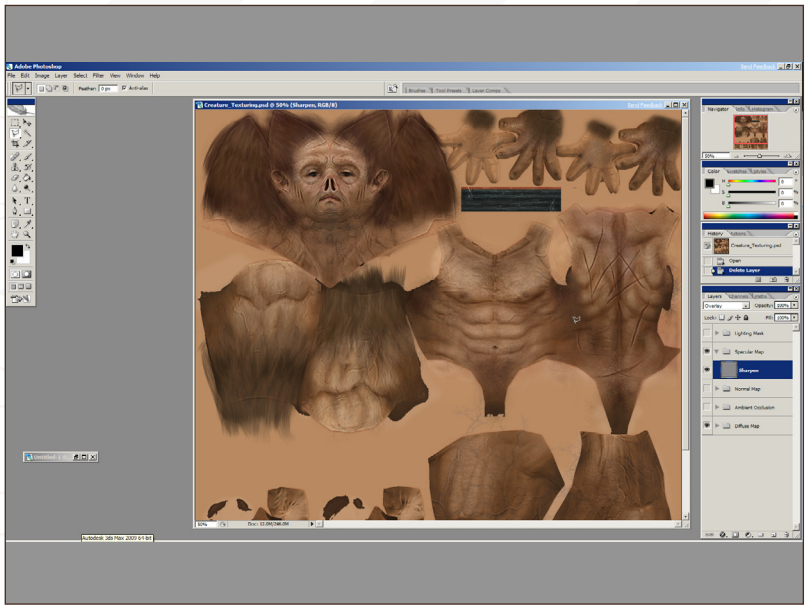


Fig 76

76. Save the file and create another new group called Specular Map. A specular map is generally used to tell the shader how bright the specular should be in a certain area of the map. Areas inside of the nostril, of stubble or fine hair, and otherwise dry parts will not be as reflective as parts such as the ears or lips. We need to communicate all that information in a map, which is why we have the specular map.

Start off by taking off Grey Cavity layer and duplicating it. Move it up into the specular map group. Now click Filter > Sharpen > Sharpen to apply a Sharpen filter to the layer. This brings out more detail in our map. Most of the effects we will do during the creation of the specular map will be adjustment layers. If in the future you decide to modify the diffuse map, remove hair, or change the skin texture, our specular map will be updated automatically and simply need a re-export, as opposed to a complete rework (**Fig.76**).

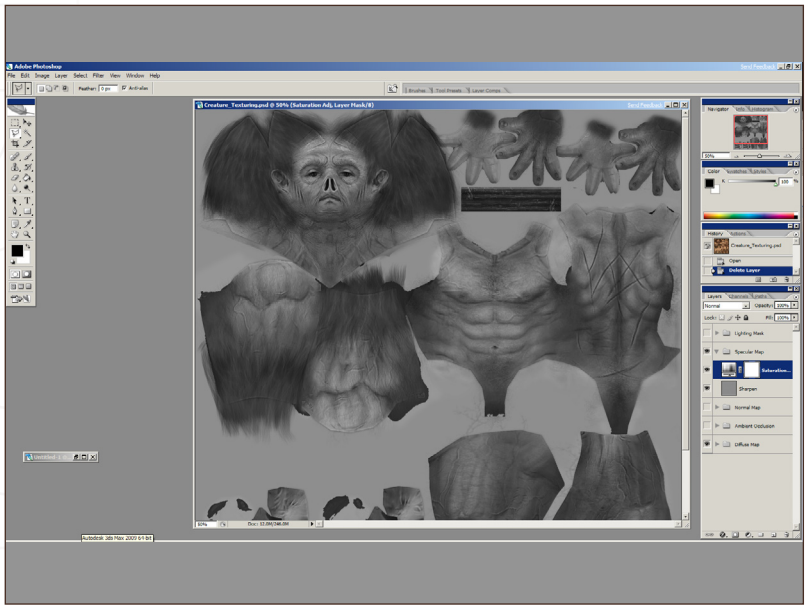


Fig 77

77. Add a Hue/Saturation adjustment layer above the Sharpen. To add an adjustment layer click on the half-white half-black circle next to the layer mask and new group buttons. Decrease the saturation to 0 and hit OK (**Fig.77**).

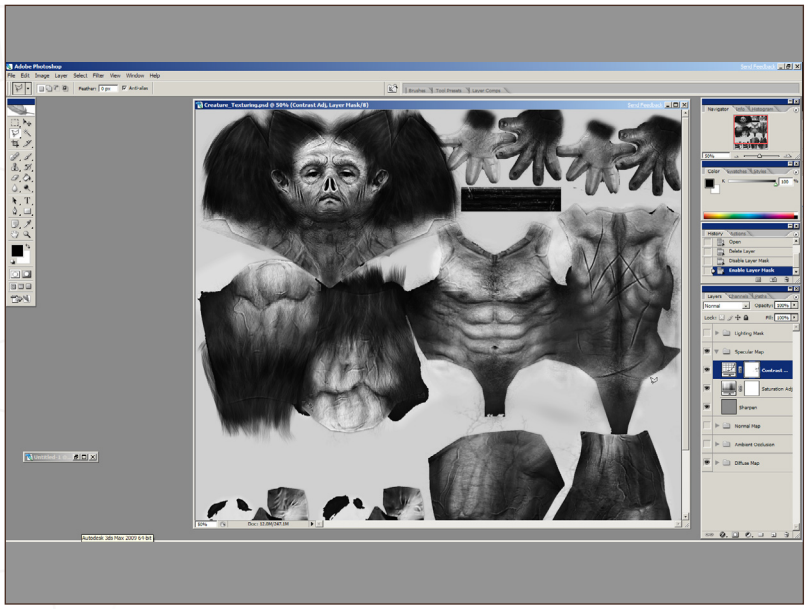
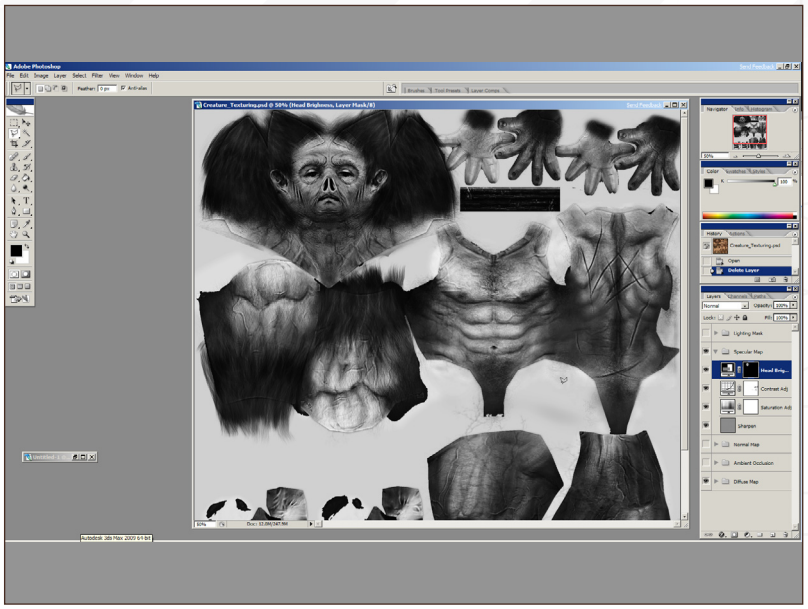


Fig 78

78. Add a Curves adjustment layer. You will see a diagonal line going from bottom left to top right. Add two points to the line, one near the bottom left and one near the top right, simply by left-clicking on the line. Drag the bottom left point you just created down slightly, and the other point up slightly. This will increase the contrast, deepen the shadows, and increase the highlights. The aim of this is to get close to a black and white map with fewer midtones, but it's important to not destroy any detail in our texture (**Fig.78**).

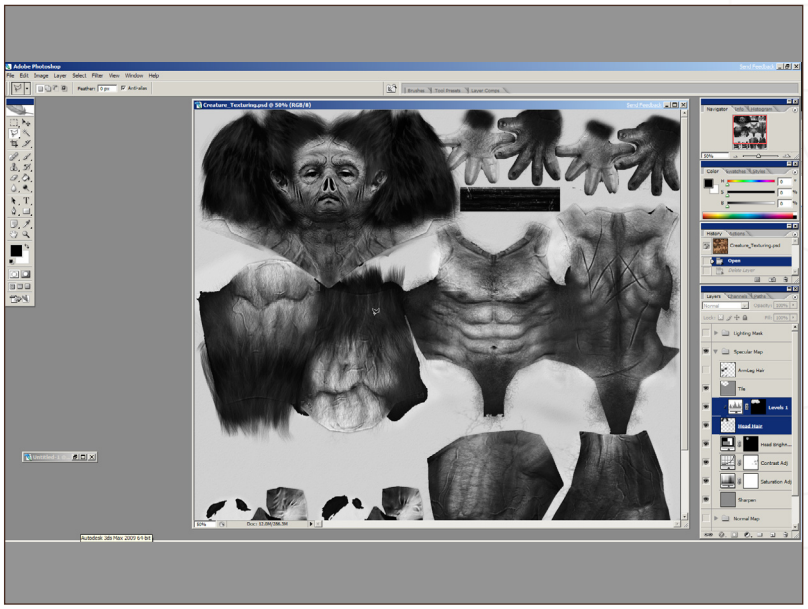
79. Now we have stronger contrast but our head is still too light, so add another Brightness/ Contrast modifier and reduce the brightness by about 15. Fill this mask with black and paint white only where the head is, to mask the rest of the texture from being affected (**Fig.79**).

Fig 79



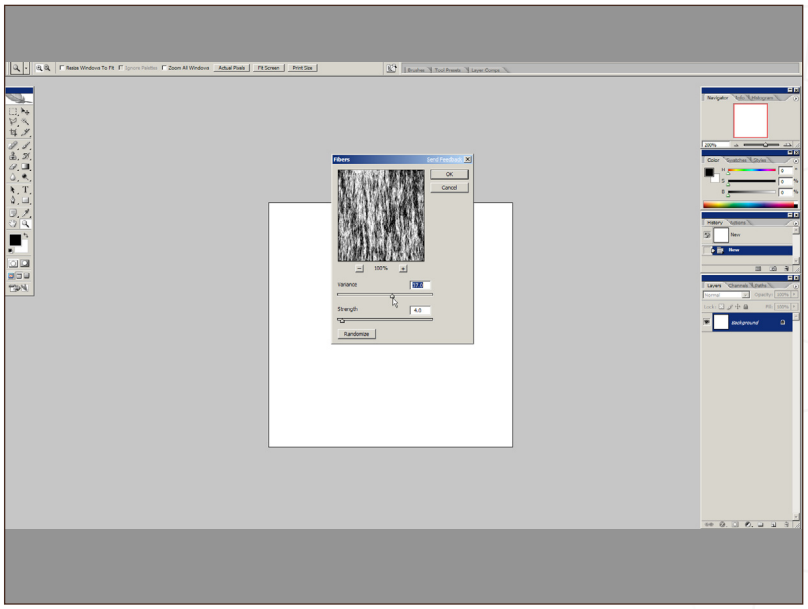
80. Take the hair layers from the diffuse map, duplicate them, and drag them also into the specular map. If you have more than one hair layer, merge them altogether at this point. Desaturate the layer and add a Levels adjustment modifier above it. Now if you hold down your Alt key and hover between the Levels adjustment and the hair layer, you will see a little chain icon. Click it and this will link the two layers together, so the Levels adjustment will only apply to the linked layer. Within the Levels adjustment options, drag the left-hand point towards the middle, and the right-hand point also towards the middle. This is another way to increase the contrast. The reason for doing this is so our hair stands out more on the specular map, so the specular will be broken in more places and the model will look more detailed. You can collapse the specular map group now, and we will move onto creating the eye texture (**Fig.80**).

Fig 80



81. Create a new document with a width and height of 512 pixels. Now create a new layer. Click on Filters > Render > Fibers and choose a reasonably high variance, a small strength, and then click OK (**Fig.81**).

Fig 81



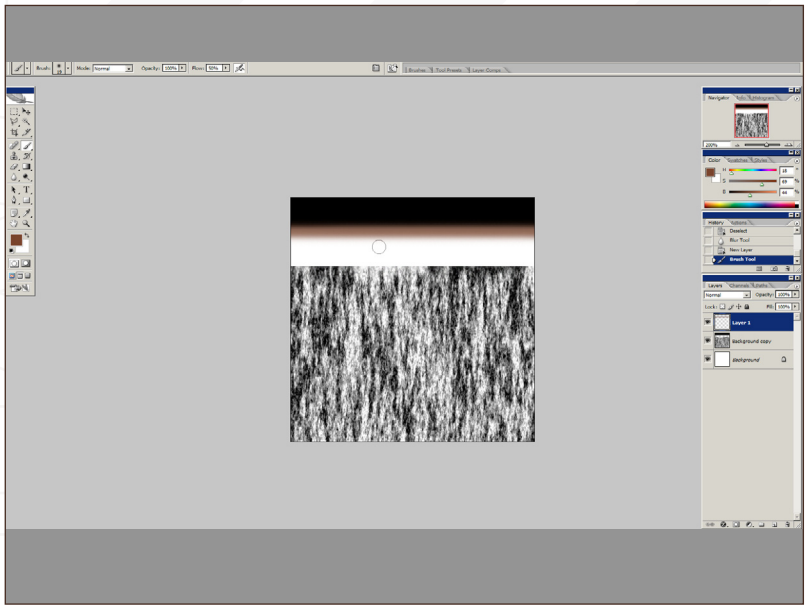


Fig 82

82. The Fibers filter is a quick way of creating some random streaks of noise that look somewhat organic. Create another new layer. Use the Free Transform tool to scale them down vertically from the top, and now, in that gap, paint a large line of black to be our pupil, and a smaller line underneath of brown (**Fig.82**).

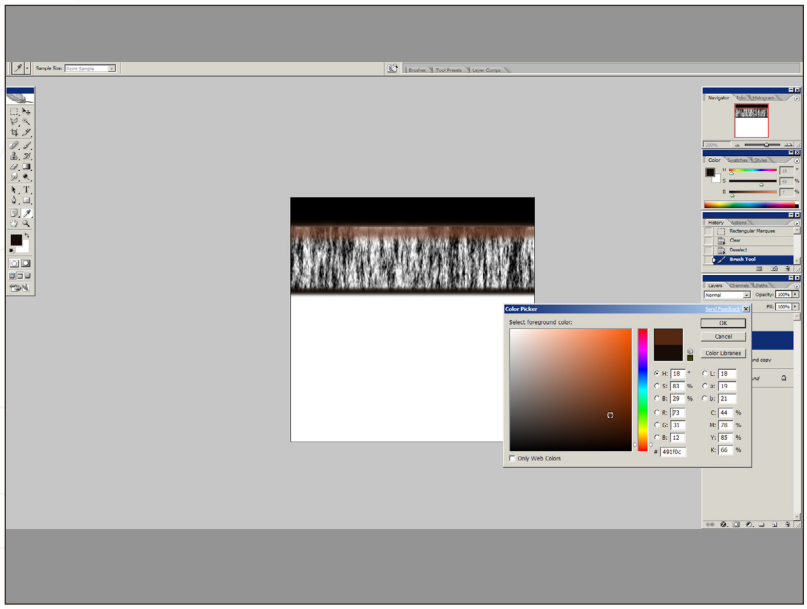


Fig 83

83. Use the Free Transform tool again to scale up the fibers and draw a darker line at the bottom of them (**Fig.83**).

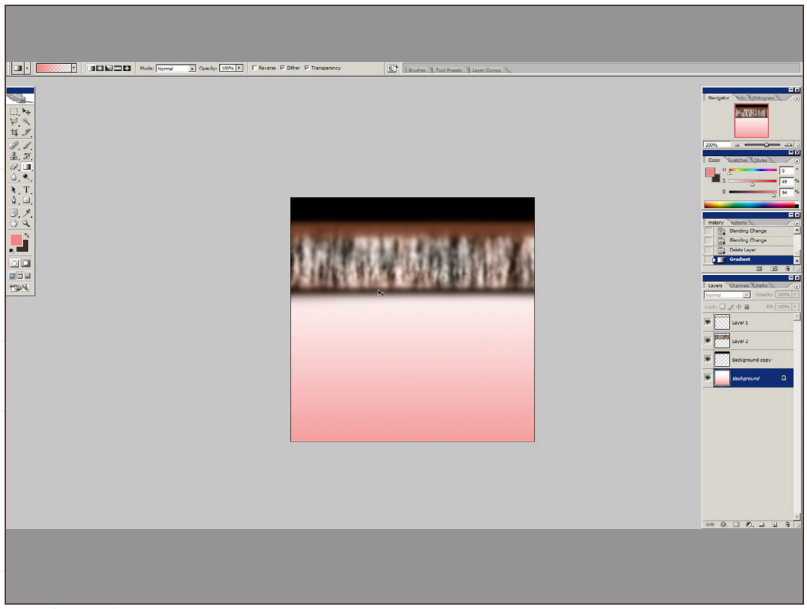
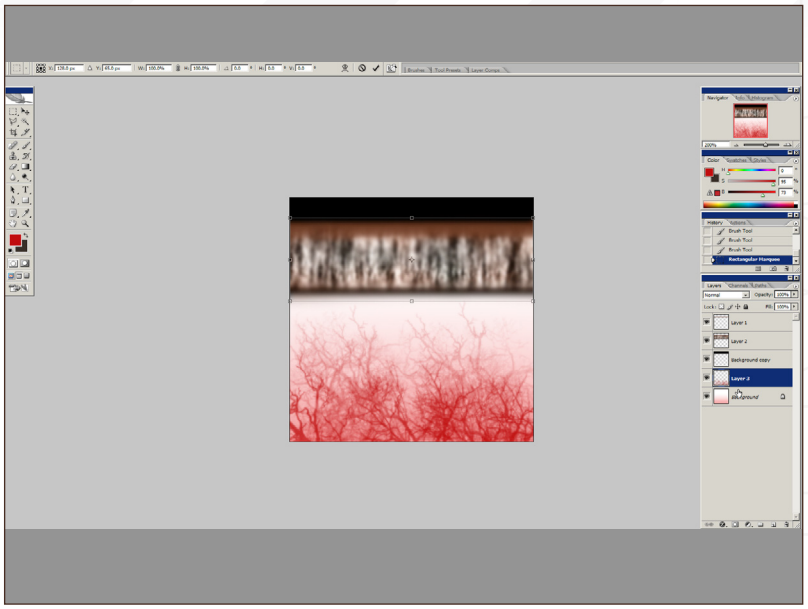


Fig 84

84. Select the layer with the fibers on and blur it considerably. On the background layer choose a pinkish foreground color and create a gradient from top to bottom – the bottom being the pinkest and the top being white (**Fig.84**).

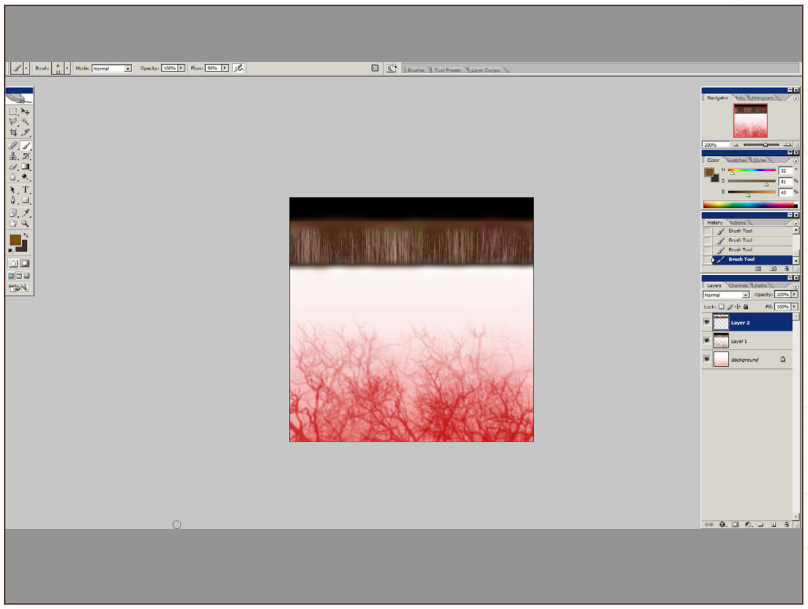
85. Create a new layer above the background layer. Choose a deeper red and, using our vein brushes, scatter some veins around – the bottom containing the most veins and the top the fewest. Merge the lines and fibers layers and use the Free Transform tool to scale them vertically slightly (**Fig.85**).

Fig 85



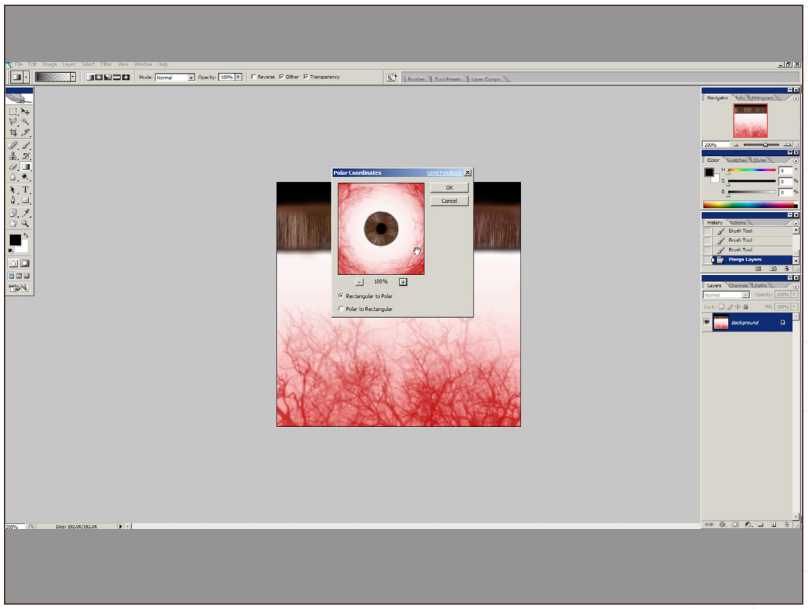
86. Now with the fibers section scaled, retain the selection, and in a new layer create additional fibers. We can reduce the contrast of these and use a layer blending mode to put back some of the sharpness. Using the paintbrush, hold down Alt, right-click over the texture and choose Color. With this mode enabled you can paint over your image altering only the color, without painting over any of the details. Give a little randomness to the fibers' colors now (**Fig.86**).

Fig 86



87. Now we've created a simple map for our eyes, which we can go into more detail on later if we wish. Something of this caliber usually will suffice when the texture resolutions for eyes are considerably small, because they do not take up too much resolution on screen. Merge all of your layers together by selecting the top layer and going to Layers > Merge > Visible. Now with the layer selected, go to Filter > Distort > Polar Coordinates and make sure the setting is on Rectangular to Polar; click OK (**Fig.87a – b**).

Fig 87a



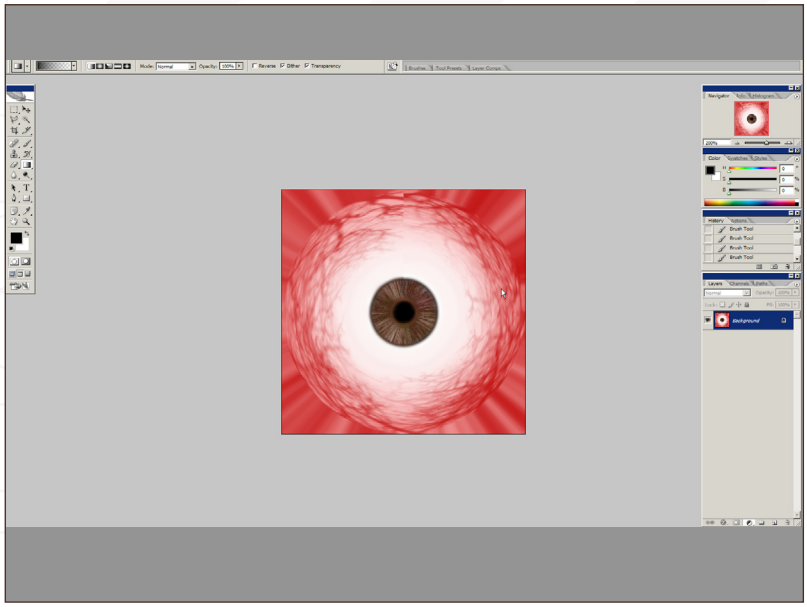


Fig 87b

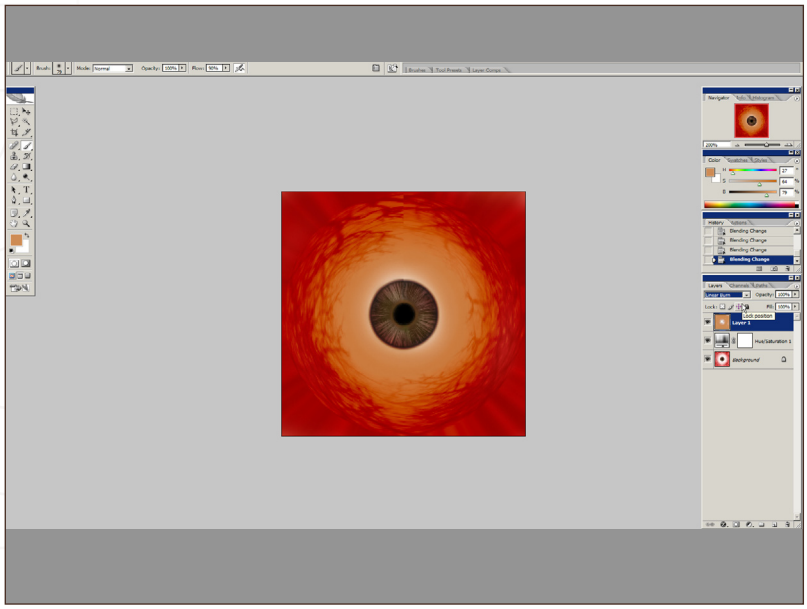


Fig 88

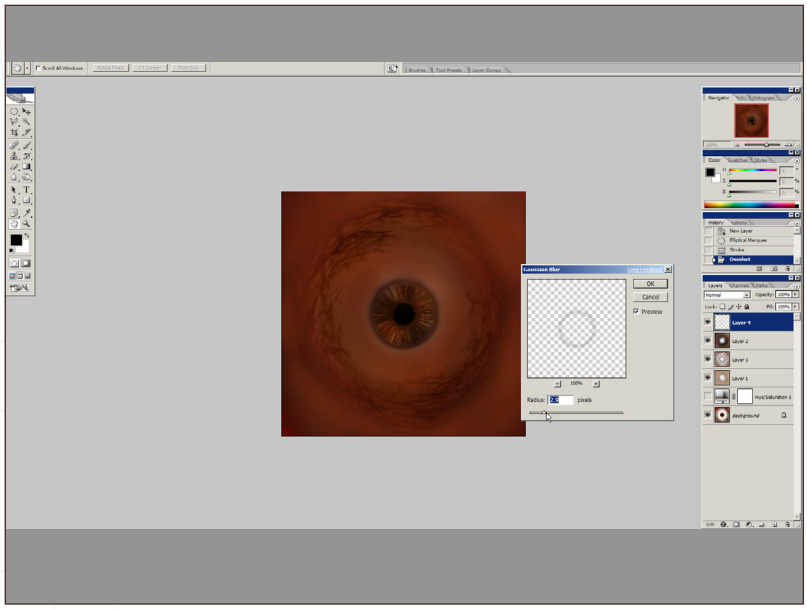


Fig 89

88. Generally, apes' eyes are somewhat darker and orangeier than humans', so let's paint that now. Create a new Saturation layer and tint the texture orange. Then paint a darker orange color in a new layer above that, and set the layer blending mode to Linear Burn (**Fig.88**).

89. Create layers above that to darken and add volume to the eyeball texture. You can also paint a ring around the iris in black and apply a strong Gaussian Blur filter to this, and reduce the opacity a little. This gives the effect that the iris is actually a separate object underneath the cornea, the black ring simulating the shadow cast. Save off this file now as our eyeball texture (**Fig.89**).

We finally come to the end of the texturing process. We've created the majority of maps necessary for building a realistic and professional shader. The texturing process can sometimes be long and arduous, but with the techniques we have used here it can be quick, efficient, non-destructive, and manageable. In the next installment we will create a basic 3-point lighting rig and an advanced character shader, along with hair and eyes, and complete our character with some accessories and a weapon.

Written by Joseph Harford and adapted for LightWave by James Busby
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Final

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- Free Low Poly Base Mesh & Textures

Eva Wild

Female Characters Creation

Introduction:

The 'Eva Wild Series' – Our aim in this series is to provide comprehensive lessons to produce a complete fully rigged, textured and anatomically correct female character. This series fits well into 3 DVDs with 3 separate professional 3ds Max instructors taking you through each if their specialties in very detailed step by step processes making this training suitable for artists of all levels.



Part 1 - Modelling:

- Complete step by step modelling of the Eva Wild character.
- Teaches the importance of studying human anatomy.
- Provides clear diagrams showing muscle flow and bone structure.
- 14 hours of comprehensive training.
- Suitable for artist of all levels.



Part 2 - Texturing, Mapping & Clothing:

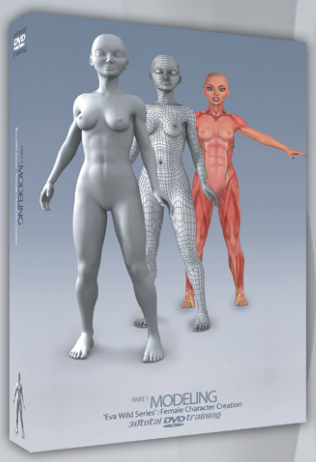
- Complete step by step texturing process of the Eva Wild character.
- Modelling and Texturing of Eva Wild garments.
- Lighting the character.
- 4 hours and 47 mins of comprehensive training.
- Suitable for artist of all levels.

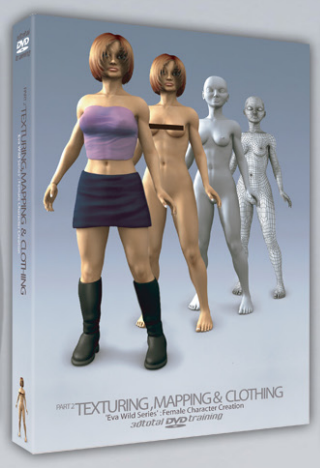


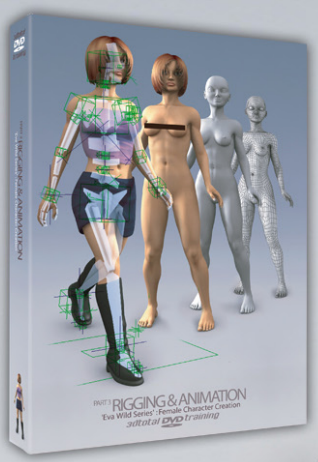
Part 3 - Rigging & Animation

- Complete step by step of setting up a fully animatable rig for the Eva Wild character.
- Creating a walk Cycle.
- Creating a simple face morph.
- 7 hours and 43 mins of comprehensive training.
- Suitable for artist of all levels.











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NEXT GEN CHARACTER CREATION SERIES

This series of tutorials provides a comprehensive guide through the process of creating a 3D character intended for use within a next gen console environment. As such, the design of the model will be tailored towards the eventual aim of functioning within a game engine and viewed in real-time. The series will cover all of the key stages of the 3D pipeline from sculpting the initial mesh in ZBrush and optimizing it in the principal 3D packages, through to texturing and applying next gen shaders. The inclusion of ZBrush tutorials will address the methods of sculpting both a low-poly mesh as well as a highly detailed version used to generate a normal map, and accompany the remaining software specific chapters that will detail topics that cover mapping, materials, lighting and rendering.

Chapter 1 – Low Poly Modelling | Jul 09

Chapter 2 – High-Poly Modelling Part 1 | Aug 09

Chapter 3 – High-Poly Modelling Part 2 | Sep 09

Chapter 4 – Mapping / Unwrapping | Oct 09

Chapter 5 – Normal Mapping – Texturing

This chapter deals with the texturing part of the series and looks at how to generate normal maps, baking out lighting effects, and the techniques of painting in Photoshop using the aid of photographic reference. Seamlessly blending in photo references with hand painted techniques are a feature, as well as a section on painting eyes

Chapter 6 – Materials, Lighting & Rendering | Dec 09

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- Free Low Poly Base Mesh & Textures





Chapter 5 – Normal Mapping – Texturing

Software Used: Maya, xNormal, Photoshop, ZBrush

In the last part we looked at unwrapping our 3D model and we prepared it for texturing. This month, we will move onto baking our ambient occlusion maps (AO) and normal maps in a free program called xNormal, and painting our textures in Photoshop.

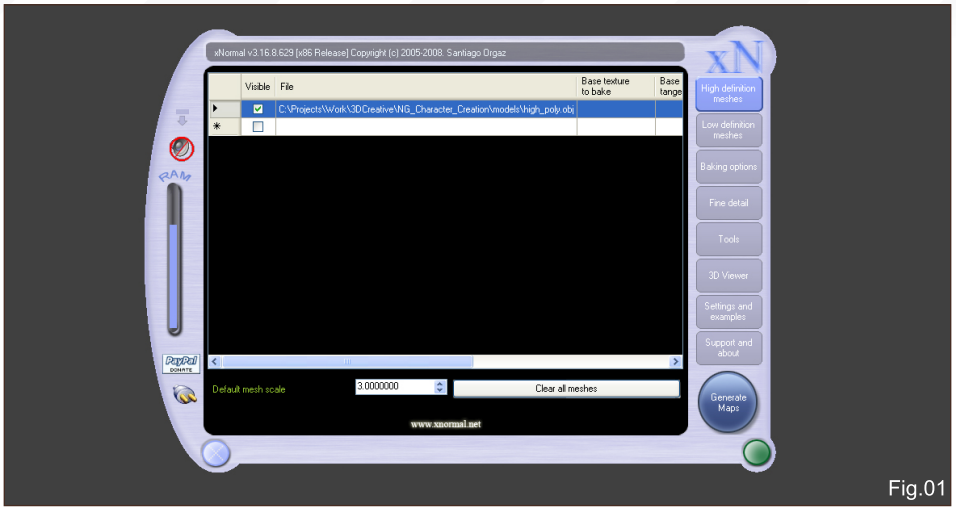


Fig.01

Normal maps revolutionized the games industry a few years ago – more specifically in around 2003 when the original Xbox started to release titles that included normal maps. With the Sega Dreamcast being the first normal map ready console, the Xbox was the first to really utilize them widely and catch the public's eye. They added another level of detail and realism to games, and now almost every new game includes normal mapping in some form.

Normal mapping in videogames ideally works by having a high- and low-polygon mesh. A computer-calculated map alters the normals of an object in realtime to visually make the low-poly object look like the high-poly object, but without adding any more polygons. It reacts to lighting as the high-poly would and, with technologies such as CryEngine's occlusion maps, can even simulate shadowing in the recessed areas. Normal map textures "can" be created from a 2D image using tools such as the Nvidia plugin for Photoshop or the built in conversion tools found in xNormal, though the problem with this method is that they generate this lighting information from a flat, usually grayscale surface, leaving the end result more or less a glorified bump map with indentations and lacking the illusion of depth that would be created by using a high-poly source.


Fig.02

The normal map is usually a 3-channel map with each channel corresponding to one of the three axes: X, Y and Z. Sometimes the alpha channel can also contain a height map. There is a number of different software and plugins out there to generate normal maps now, and most applications have some built-in way of calculating them. 3ds Max has "Render to Texture", Blender can calculate normal maps out of the box, and ZBrush has it built in and also comes with ZMapper. Tools like xNormal, CrazyBump, PolyBump, and others, all simplify the process in their own way, too. Personally, I haven't used a faster and more efficient baking tool than xNormal.

Maya will often crash or hang when trying to import a dense mesh. This causes the user to have to find a workaround for bringing high-poly meshes into the program, such as plugins that optimize the mesh to a lower poly count (and, possibly, killing off detail you created) or breaking the model into smaller sections for easier management. Unlike Maya, xNormal doesn't need to load meshes into a viewport in order to bake textures. So, not only does it calculate maps faster as there is no memory consumption from this task, there is also next to no hassle when importing heavy meshes into the program from ZBrush.

XNormal is completely free and programmed by the genius (and generous) guy, Santiago Orgaz. Just head to http://www.xNormal.net/Downloads.aspx and download the latest version of the software. XNormal is becoming widely used in the games industry, with many AAA companies using it on a daily basis.

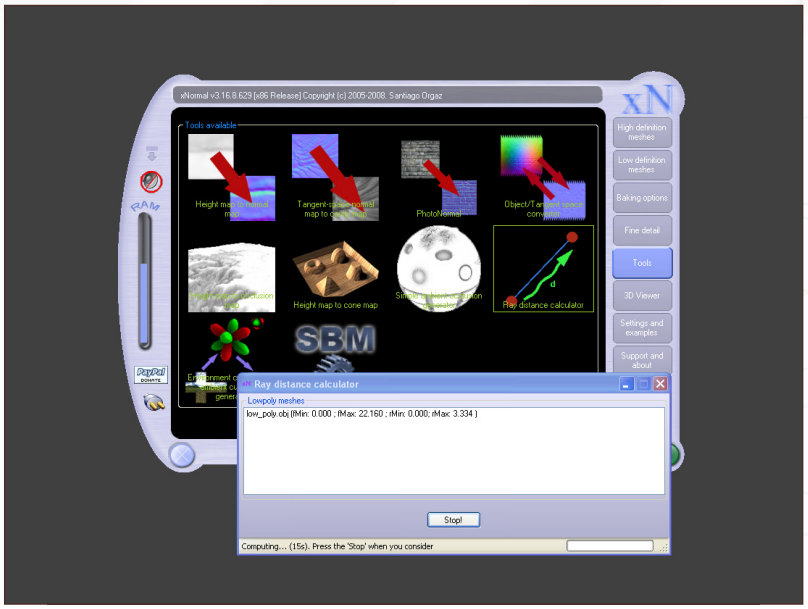
On the tutorials section of the xNormal website, you can watch a quick overview of the interface, buttons, and features included in xNormal. I suggest you do this to familiarize yourself with it before continuing: http://www.xnormal.net/Tutorials.aspx

1. Open xNormal, and under the "High definition meshes" tab, right-click over the File dialogue box and search for your exported high-poly mesh. You can essentially keep all of the settings at default for this model; however, if you built your model at a small scale, it may be a good idea to increase its size through xNormal for baking purposes.

The value for mesh scale can be entered towards the bottom of the xNormal screen. Make sure all of your meshes have the same scale if you alter this. In my experience, if a mesh has a lower scale value, there can be some conflict or inaccuracies during the baking process (**Fig.01**).

2. Similarly, click on the "Low definition meshes" tab and load in your low poly mesh. This is your unwrapped game resolution model. Once the model is loaded, scroll over until you see the "Smooth normals" column and switch it to "Average normals". This will basically apply one smoothing group to your entire model or, rather, make all of your edges soft edges. The alternative – default – option is to use exported normals which could possibly preserve hard edges that you do not wish to have. As mentioned earlier, it is best to avoid hard edges when possible due to the lighting errors they cause when used on a normal mapped model (**Fig.02**).

Fig 03



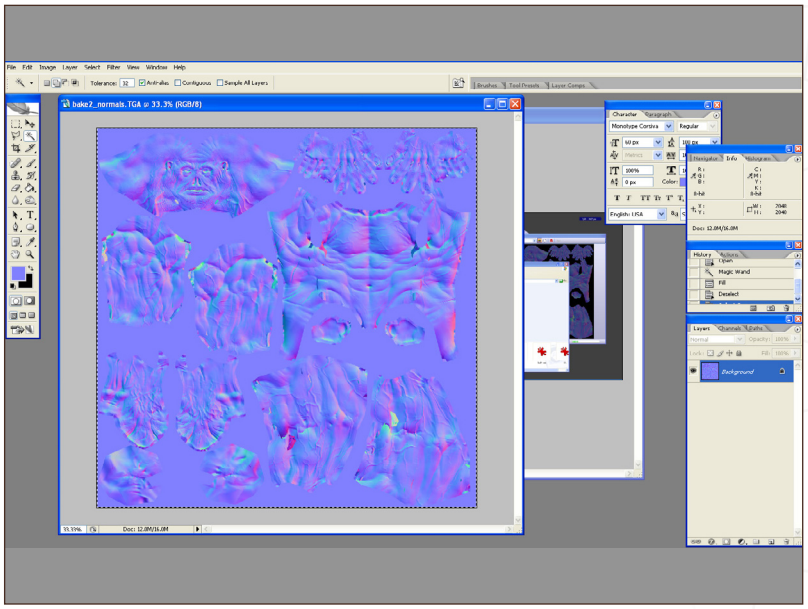
3. Next, go to the Tools tab and click on the "Ray distance calculator". This will open a pop-up window – click Go! This will calculate the maximum distance that rays will need to be shot from the front and back of your model in order to capture all of the detail of the high-poly model. Let it process for about 30 seconds. Take the two maximum values that are provided and enter them into your low-poly meshes maximum front and rear distance values, located back in the Low definition meshes tab (**Fig.03**).

Fig 04



4. With all of this information entered, click the "Baking options" tab. This will present you with a few different options to choose from, such as map size, maps you would like to bake, Edge padding, and so on. Type in a name for your map and select a file type. Make sure the size is also at 2048 by 2048. I've set the background color to black, but white works well, too.

Fig 05a



Click on the dots next to Ambient Occlusion, under "Maps to render". This brings up the Occlusion map window where we can set the options for the way the map will be calculated. The important values to change are:

- **Rays** – The number of rays cast from one point on the mesh – a higher value giving a softer and more accurate solution at the cost of render time, a lower value is quicker to

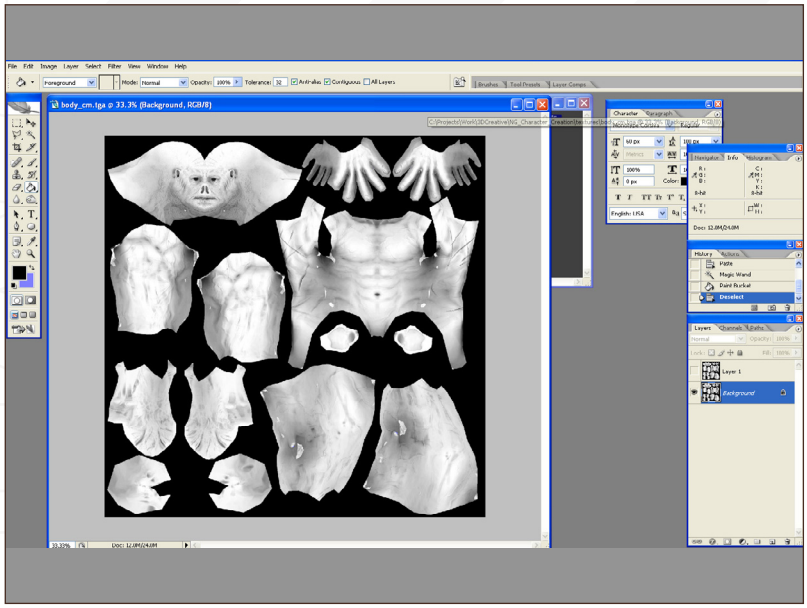


Fig 05b

render but is dirtier. I find a value of 256 is optimal here

- Leave **Occluded Color** and **Unoccluded Color** as they are. We can always colorize the map later in Photoshop

- **Spread Angle** – Increase this value for a softer map, with larger forms being smoothed out and smaller detail not picking up much shadowing. Decreasing the value will result in a sharper map, and areas of indentation will pick up more detail. A value of 150.00 will produce a quite sufficient map for our use

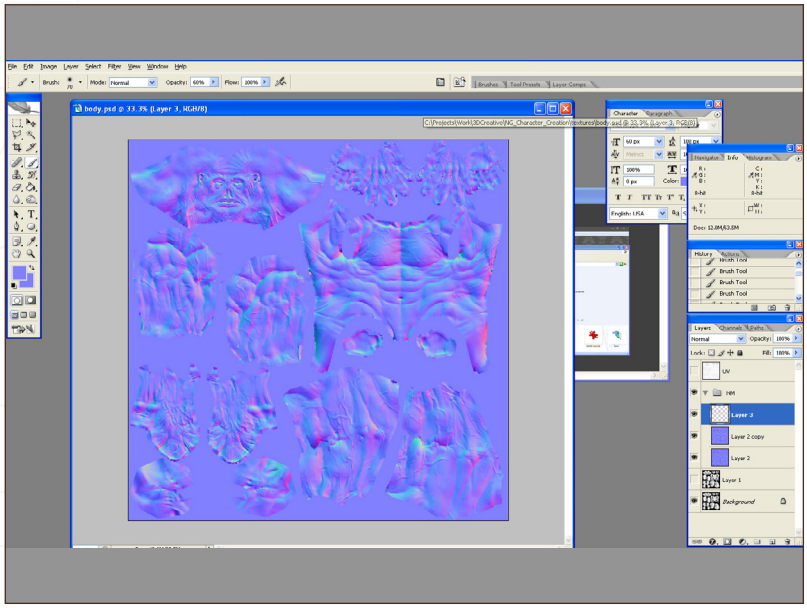


Fig 06

- **Limit ray distance** – This option should usually be left off. Most of the results whiteout and become over bright when it's turned on

You can modify the other values to your tastes, but bear in mind we can produce a lot of the same results by calculating the map and editing it in Photoshop later.

With your settings chosen, all that's left to do is click the big blue Generate Maps button. Notice that once you click it, xNormal jumps into action. You can preview the result of the ambient occlusion generation by clicking on the drop-down box at the top of the Preview window and selecting "Notify tile updates". Bear in mind this is noticeably slower than when this option is turned off, so I suggest only using it to check on progress (**Fig.04**).

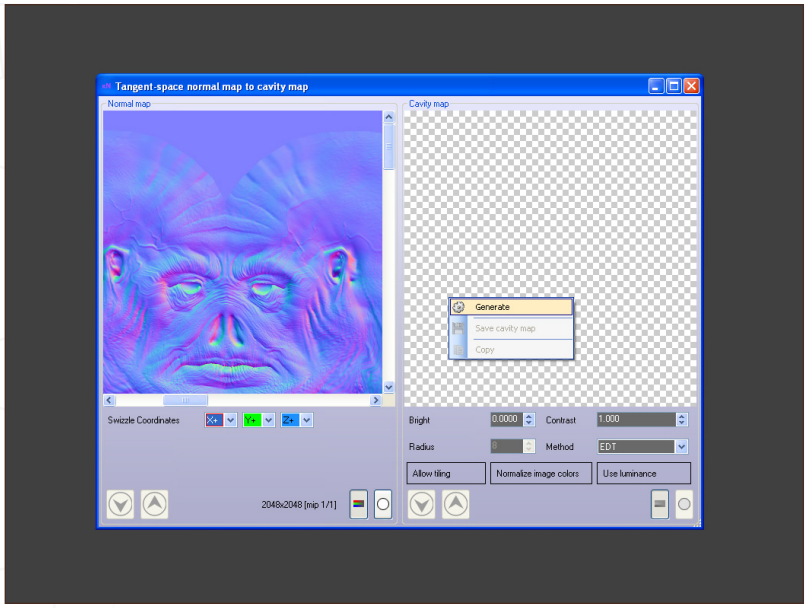


Fig 07

5. With our ambient occlusion, cavity maps and normal map all ready to be used, we can start to set up the Photoshop file to create our textures. You'll notice that there are only a few trouble areas in each map, such as behind the knees and under the arms. The reason that these areas didn't calculate properly is that their geometry was either overlapping or so close to one another (both sections of the leg being right on top of each other, for example) that improper

information was taken from our casting rays (**Fig. 05a – b**).

6. The good news is that these areas can easily be fixed. In the AO map, trouble areas can easily be blurred out or painted over with a light gray color. The normal map can be a bit trickier as its colors determine lighting information, and if something is severely wrong in your map it can affect how your map looks in game. I will Clone Stamp similar areas onto the trouble area, for example continuing the same shading under the arm the entire way up to the armpit and blend out problem areas with a neutral blue color (128,128,255). Using the ray cast calculator, as mentioned before, will greatly limit the amount of touching up you need to do, so this shouldn't take too long (**Fig.06**).

7. Next, go back to xNormal and, under Tools, select "Tangent-space normal map to cavity map". This tool will convert our normal map information into a grayscale cavity map that can also be used as a fairly flat, yet detailed, AO map. In the pop-up window that appears right-click over the left section and search for your normal map. Once it is loading, right-click over the right section and click Generate (**Fig.07**).

8. After a few seconds of processing, a black and white (mostly white) texture will appear in the right section – right-click over it and save it to your textures folder. It's really that easy! The reason why we've waited until now to create this cavity/secondary AO map is that all of the detail is taken from our normal map; if our normal map had the errors we corrected previously, these errors would be in this map as well, causing another stage of unnecessary cleanup (**Fig.08**).

9. Your collection of textures thus far should look something like this (**Fig.09**).

10. I like to organize my textures into one PSD file, organizing the different maps as Groups. The naming convention I usually use is CM, NM, SM, etc., which is generally the type of

Fig 08

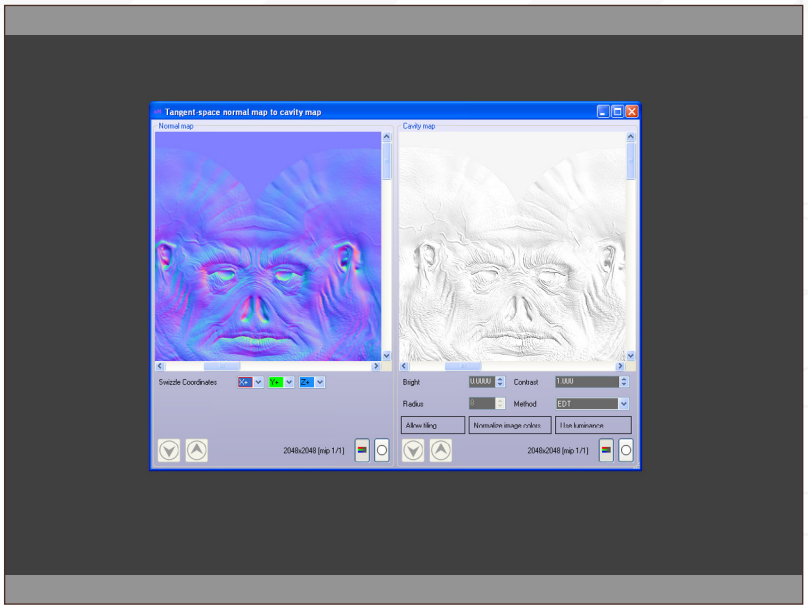


Fig 09

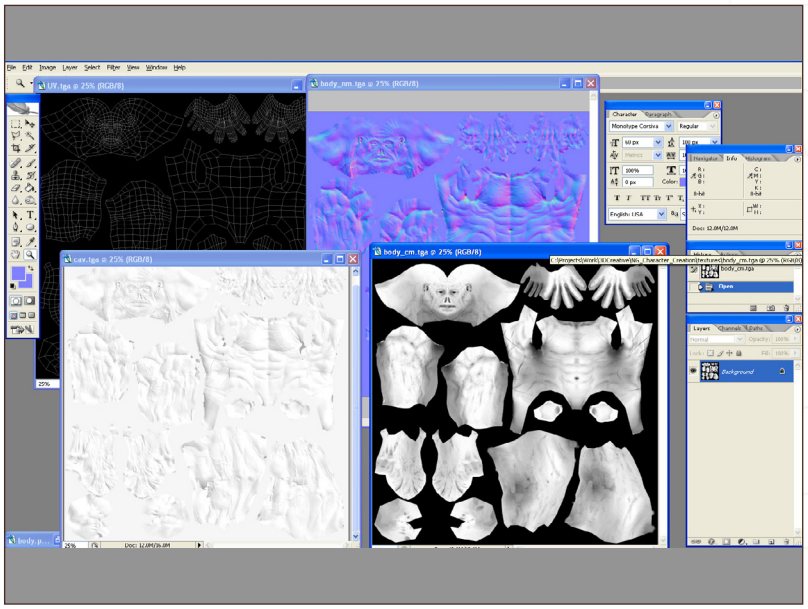
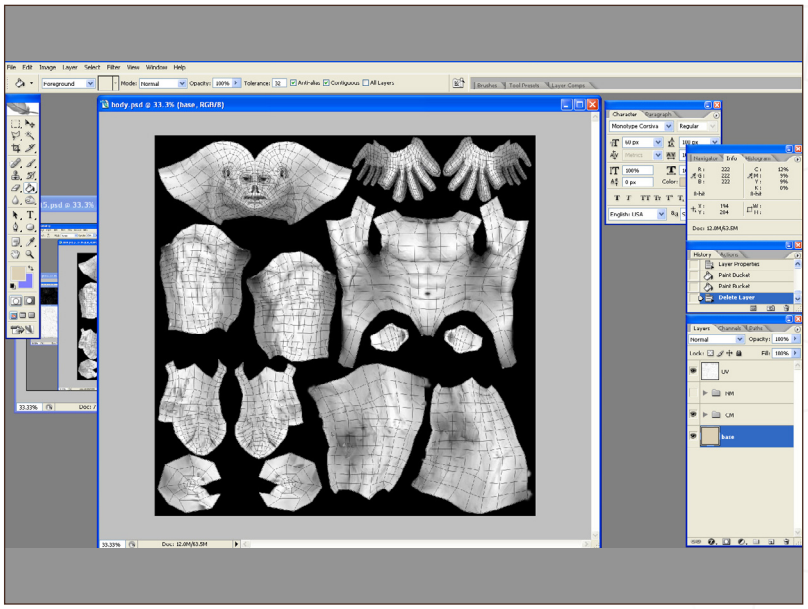


Fig 10



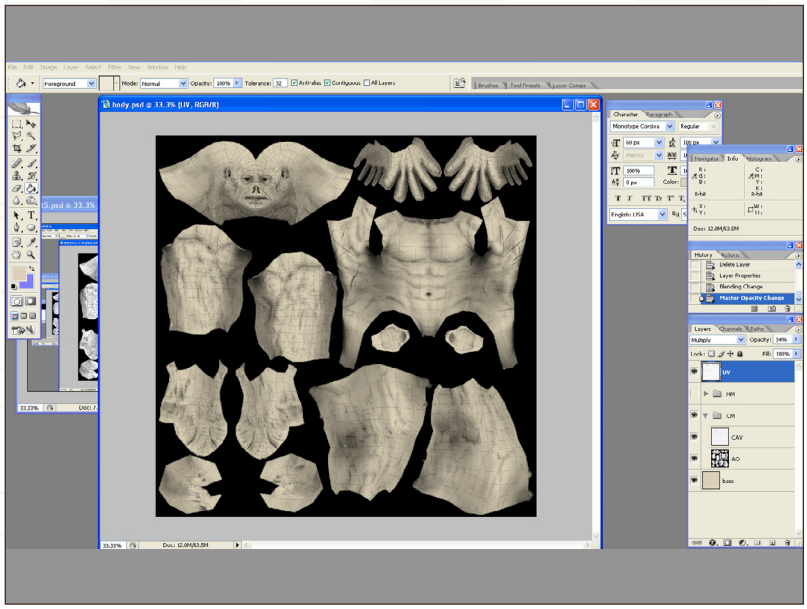


Fig 11

map (Color, Normal, Spec, etc.) and M for map. Different companies have different conventions and different engines have different needs, so nothing here is set in stone. Create these groups and drop your baked maps into the appropriate category, hiding the normal map info for now. I tend to keep the UV layer at the top of my layer order. Invert the UV map (Ctrl + I) and set its blending mode to Multiply. With the AO maps in the CM group, create a new layer underneath them and fill it with a skin tone color that we will use for our character's base color (**Fig.10**).

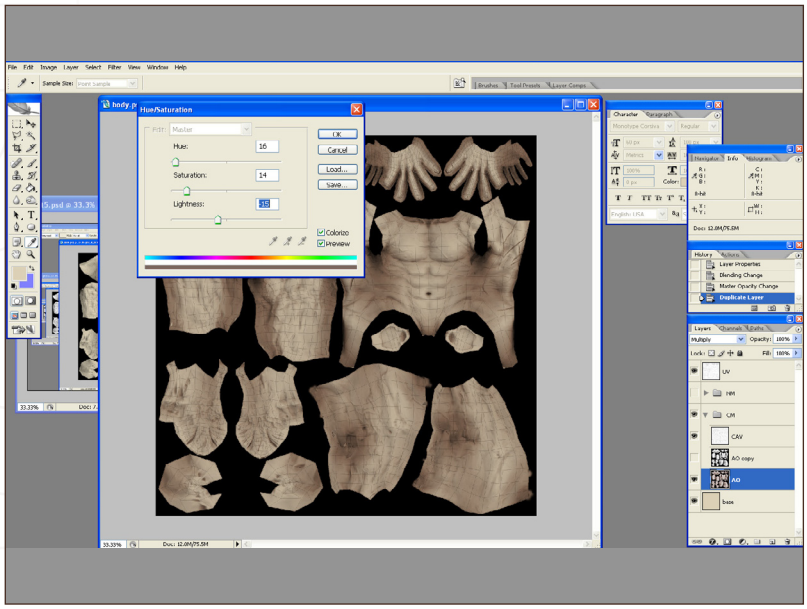


Fig 12

11. Set the primary AO layer to Multiply as well; you will now see the base color show through in the white areas of the occlusion map. We already have a map that looks quite far along in the texturing process, with all of the muscles and detail now becoming more defined (**Fig.11**).

12. At this point I usually duplicate the shading layer and then hide the duplicate. Now select the original shading layer and go to Image > Adjustments > Hue Saturation. Click on the box labeled Colorize and tint the map slightly red, since skin is not gray in areas of shadow, it actually takes on a more saturated red color. Instantly, our texture feels more alive (**Fig.12**).

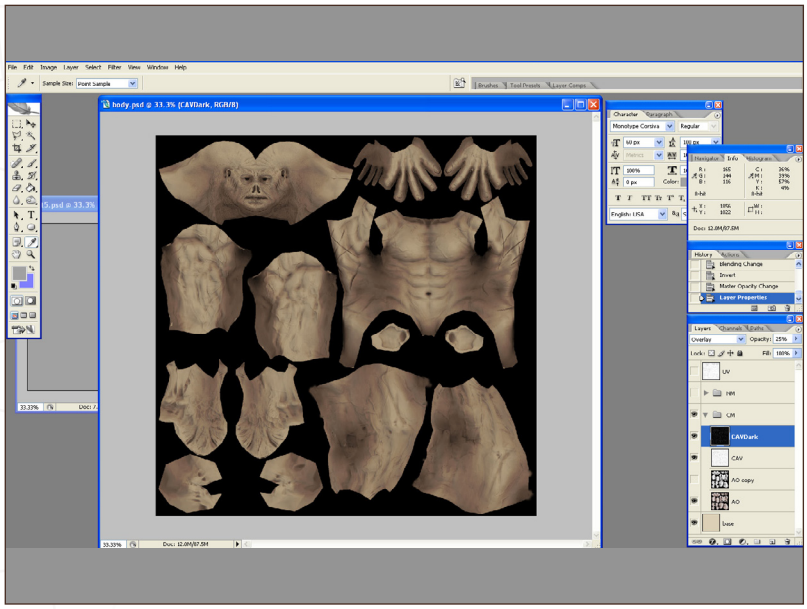


Fig 13

13. Change the layer mode for the cavity map to Overlay and reduce the opacity to around 25%. The cavity white layer, however, can be set to Multiply with an opacity of 50%. It's important to know how blending modes work and what they can be used for. There are many guides online to really find out how each one works, but usually running through the drop-down list with the up and down arrow keys can quickly give you a variety of different effects from which you can pick the most fitting for the situation (**Fig.13**).

Our two blending modes here, Multiply and Overlay, are fairly simple:

Multiply looks at the color in the texture

of the layers below it and multiplies it with color in the corresponding area of the layer. Multiplying white gives no effect and effectively produces transparent areas; black creates 100% opaque areas. Any color painted in the multiply layer over other colors will result in a darker color.

The **Overlay** blending mode works in a similar way to Multiply, but instead of white as having no effect, 50% grey is effectively transparent. Any light or dark colors painted onto the map will be screened or multiplied with the colors underneath, brightening or darkening them. The Overlay blending mode retains shadow and highlight information in the underlying colors, making it a good choice of blending mode for adding tileable detail, or in this case light and dark information from a cavity map.

14. Let's move onto painting the actual texture now. Create a new layer above the base color layer. Now, starting with the hands, choose a lighter color than the base color and paint over the knuckles and all protruding parts of the top side of the hands. Also paint in the fingernails at this point to differentiate their color from the color of the skin. You can also paint the wrinkles to give them some volume. We don't want to be painting too much highlight and shadow information into the map as the normal map and specular maps should handle most of this job, but it's always good to add a little bit in the diffuse map just to accentuate the shading. You can also choose a darker color at this point and paint the deeper parts (**Fig.14**).

15. Move onto the back of the character now and paint red into the large slashes on his back. Nothing too detailed, again we just want to differentiate them from the skin color (**Fig.15**).

16. Hide the cavity and shading layers, and then import reference images of the front, back, and side of a male model. It doesn't really matter at this point if the man's skin tone or skin texture

Fig 14

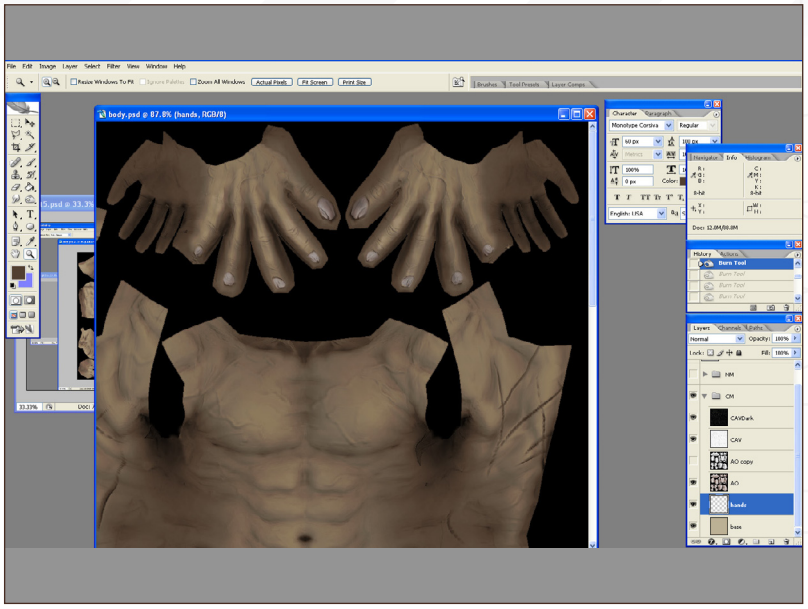


Fig 15

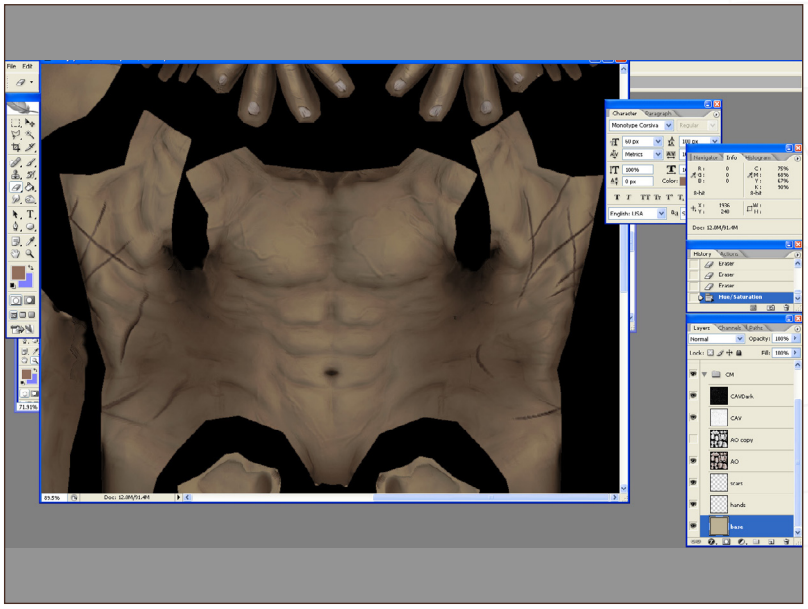
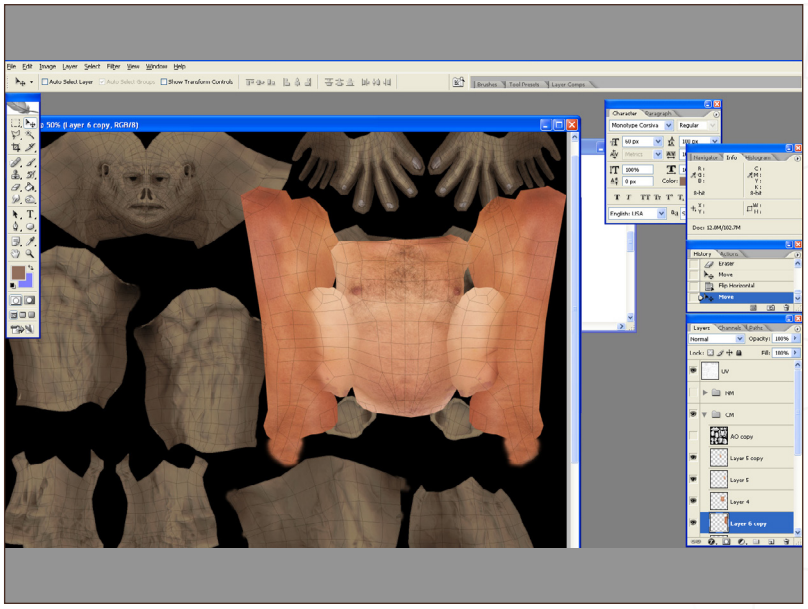


Fig 16



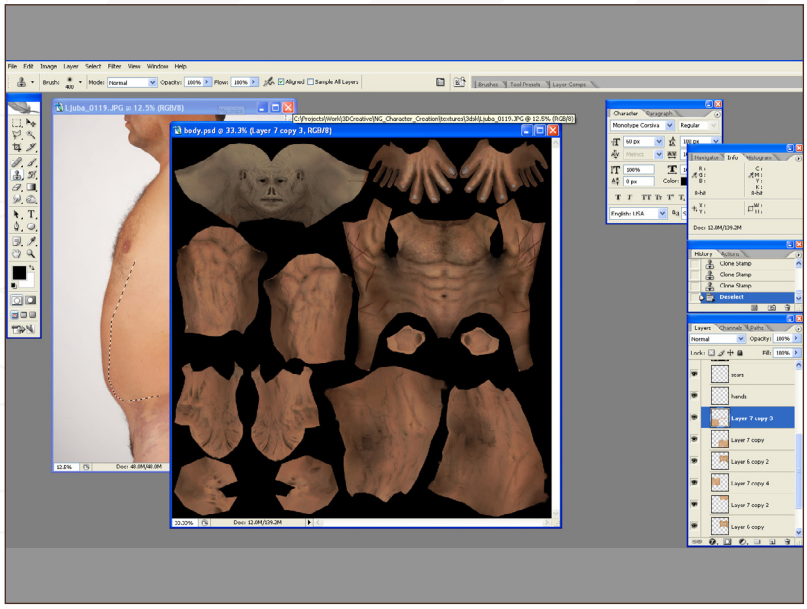


Fig 17

matches the concept as we will heavily edit it later. We just want a little bit of variation and color, and to give us a base to work from. Using the Marquee Select tool (M), select the chest of the reference image and drag it onto our texture. Do the same with a section of the side and back of our character. Generally, in your photo reference that you bring in, try to avoid any strong lighting information in the photos or any bits of detail that will conflict with our model and texture. For example, because this person being photographed has more of a belly, the lighting information is fairly flat and gives us fewer problems when we bring that under our AO shading layers. Had this person of had a ripped stomach, it would be harder to line up that detail to our shading layers (**Fig.16**).

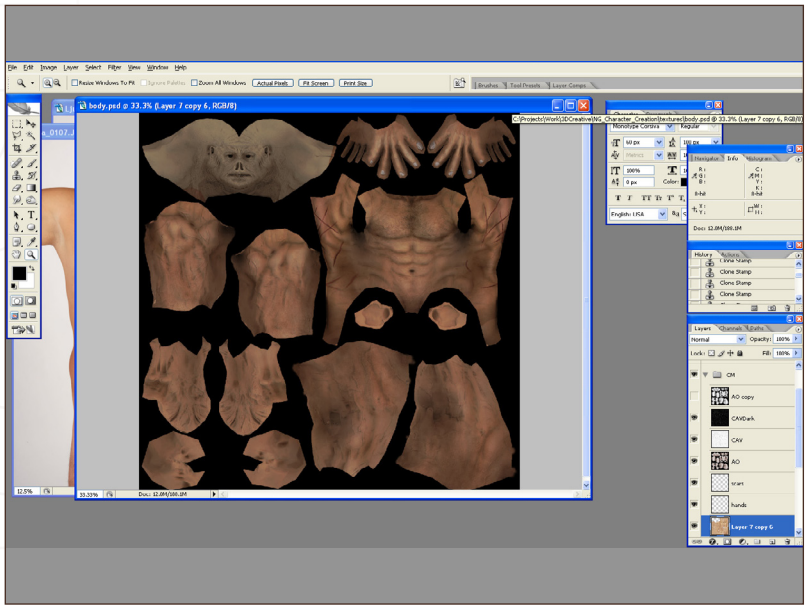


Fig 18

17. Now unhide the cavity and shading layers. We are going to work directly on the layer we just created from our reference photographs. We need to define the muscles now as we defined the hand earlier. Select the Dodge brush from the tool palette. The shortcut for Dodge and Burn is O, with Shift + O cycling through the Dodge, Burn, and Sponge tools. When Dodge or Burn is selected, we have the option at the top of the screen to change the range. We can specify if the tool affects the midtones, shadow areas, or highlights of the image. For now, leave it on midtones. We'll use the Dodge brush to paint over areas where the muscle sticks out. This only needs to be done lightly to hint at a 3D effect, as any more and it will look too baked. Also, work on the back of the character in the same way. You can also use the Burn Tool to darken areas where muscles overlap or cast a small shadow. Again, be careful to not go too far (**Fig.17**).

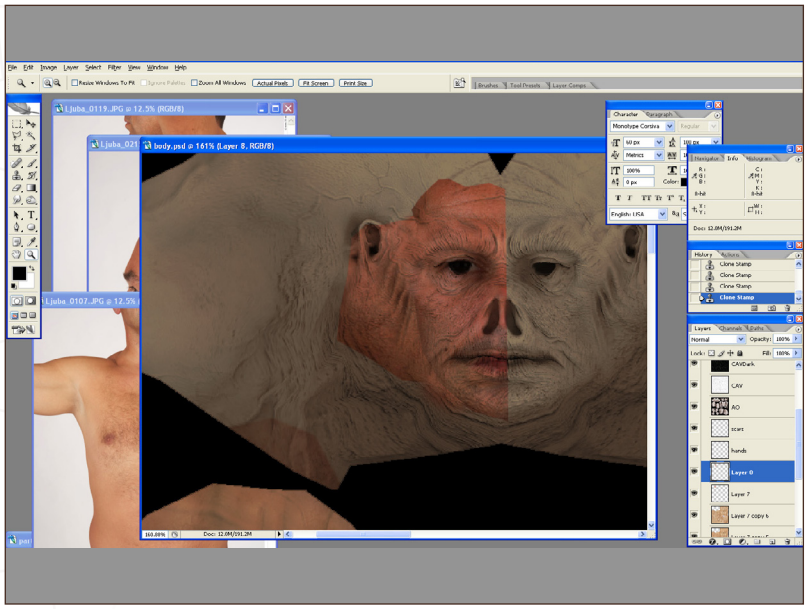


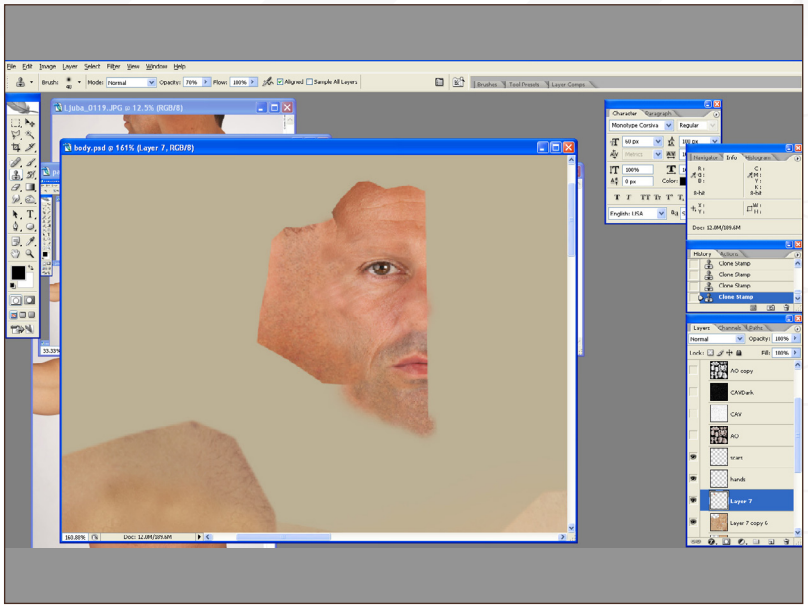
Fig 19a

18. You can take this opportunity to do the same technique on the rest of the model, applying the same principles to the muscles on the legs, arms, neck and feet (**Fig.18**).

19. Using more photo references now, find an image of a man's face that looks like it would

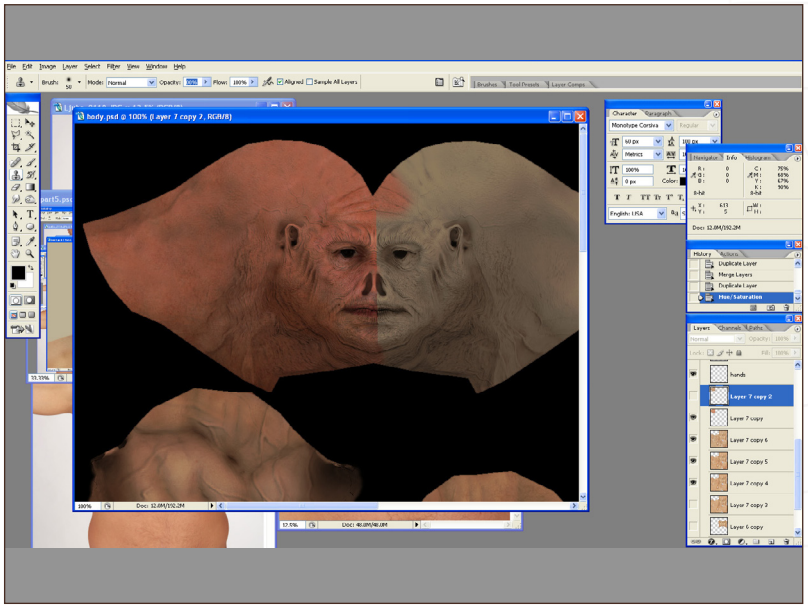
work well for our character. He doesn't have to be ape-like; again, we just need a little bit of color variation and natural detail. Cut out just the face section and paste it directly above our photo reference layer. Line up the details of the image as close as possible to the appropriate areas of your UV map (eyes matching the eye area you laid out in your UV unwrap, for example) (**Fig.19a – b**).

Fig 19b



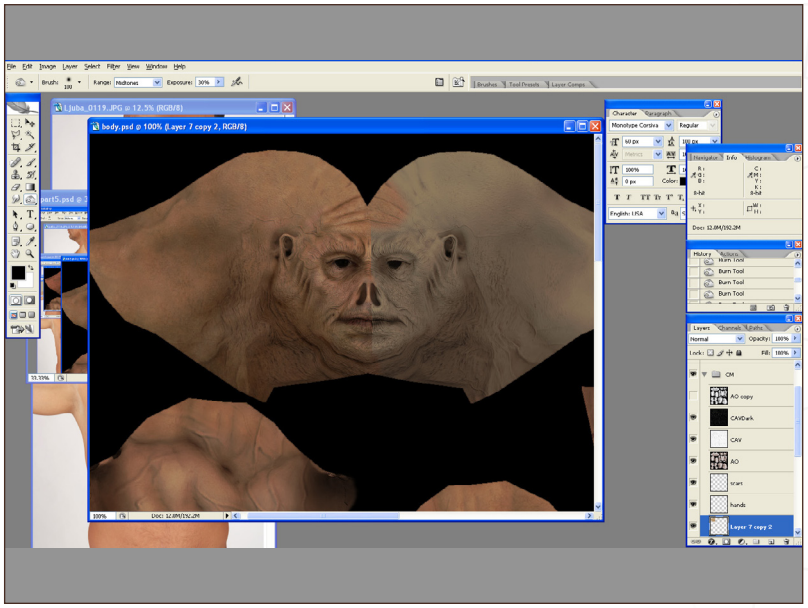
20. To bend details in order to match the UVs better, I tend to use the Transform > Warp tool. Once the major details are defined, like the lips, eyes and cheeks, clone some of the flatter skin areas to cover the rest of the head, or if possible bring in other pieces of photo reference to cover other areas of the head and to fill in holes (**Fig.20**).

Fig 20



21. The photo reference for the head was a bit redder than the rest of the body; using Image > Adjustments > Hue/Saturation, bring the color of the head to a color similar to the rest of the body. Much like the rest of the body, Dodge and Burn the photo reference layer to exaggerate details. Again, don't go too far (**Fig.21**).

Fig 21



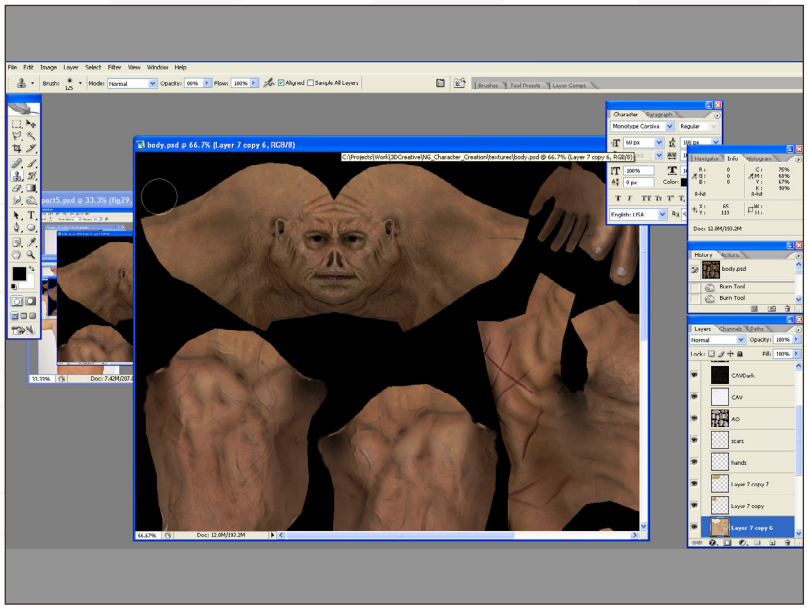


Fig 22

22. Because our character's head is fairly symmetrical, we can copy the layer of our head texture and mirror it horizontally (Edit > Transform > Flip Horizontal) and move the new half over to its appropriate area. Now we should have a fully textured head. Our color information is coming from real skin; light and dark areas of detail coming from our cavity maps; shading coming from our ambient occlusion map, tinted to look more natural – all of this detail is supported by our normal map. What used to take days now takes mere minutes! With refinement and patience we can continue this process and turn this into a realistic, efficient texture for our character (**Fig.22**).

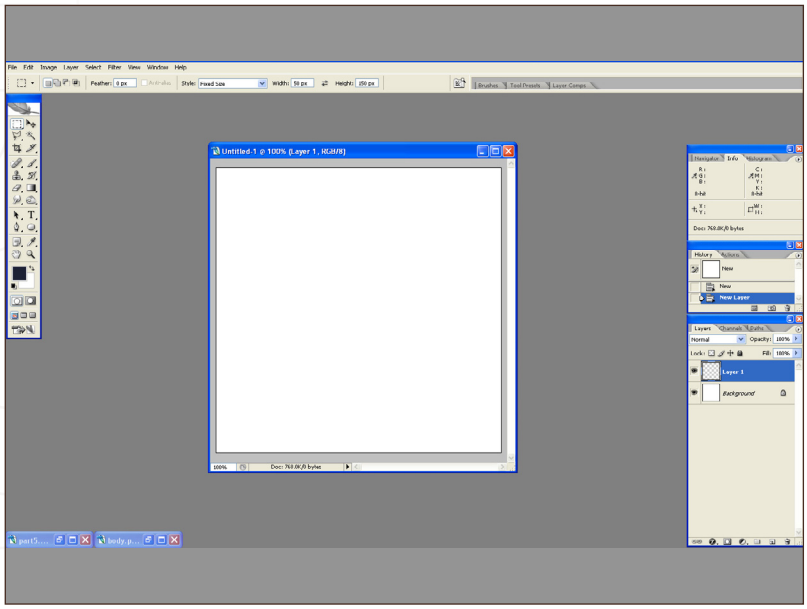


Fig 23

23. Let's work on painting some hair onto our character. We should first create a hair brush so we don't have to paint each hair one by one. Start a new document by going to File > New and set the dimensions to 512 by 512 pixels (**Fig.23**).

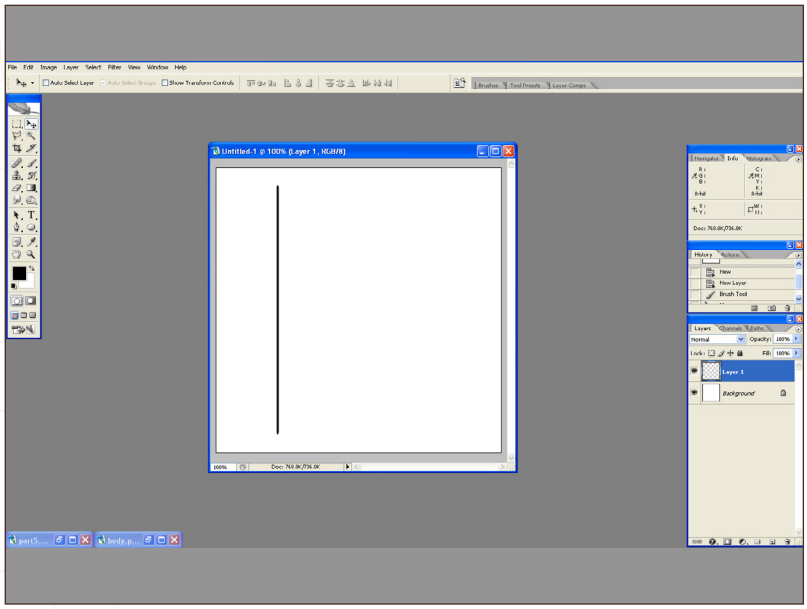
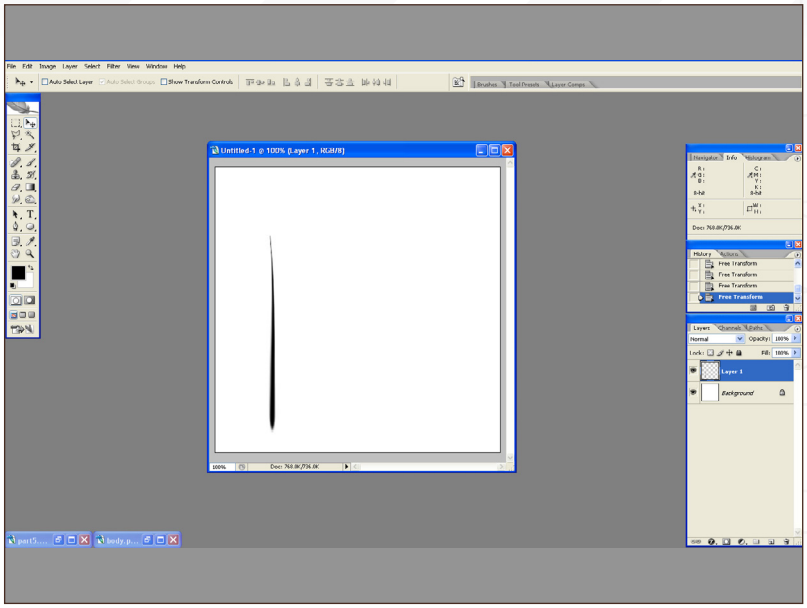


Fig 24

24. Now make a new layer and, using the paintbrush (B), draw a vertical line from near the top to near the bottom (**Fig.24**).

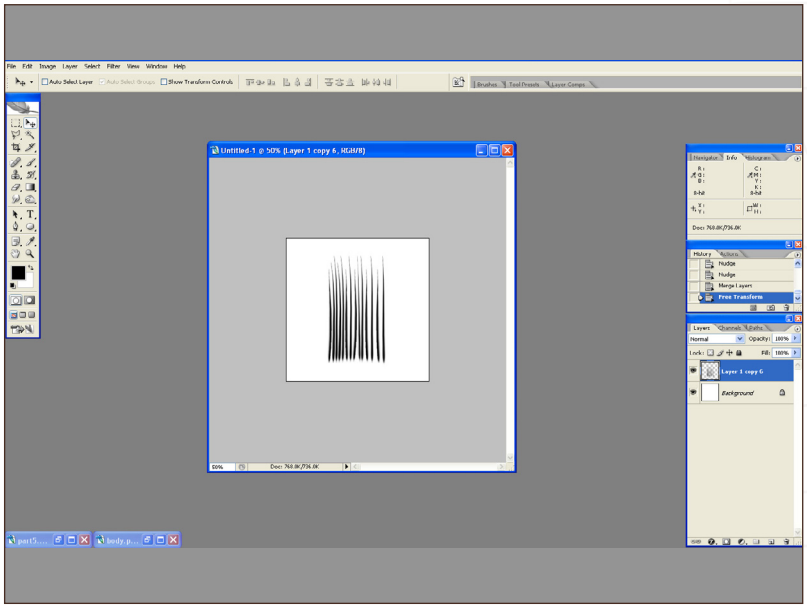
25. Using the Transform tool (Ctrl + Alt + T), scale the top of the line inward to become just a point. Hold down Ctrl + Shift + Alt and drag one of the top left or right control points inwards. Without exiting the Transform tool, you'll notice that the top menu bar now has controls applicable to the active tool, currently the Free Transform tool. On the right-hand-side we have a tick and a cross to either commit to the transform or to revert to how it was before. Next to this there is a button to switch to Warp mode. Warp essentially lets you bend and shape the current image using a small number of control points. Use these control points to give a little variation and bend to our line (**Fig.25**).

Fig 25



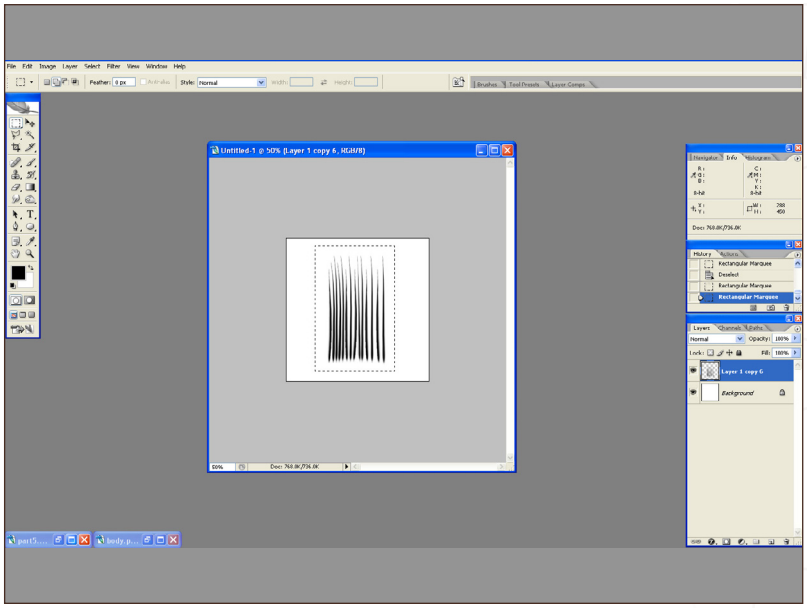
26. Now, using the Move Tool (V), hold down Alt + Shift and drag your line to the side. Enable Free Transform by hitting Ctrl + Alt + T and scale and warp the line slightly for further variation. Go ahead and duplicate the line in this way several times. We're looking for between 8 and 16 lines that we will use for hairs. Now, using the Eraser Tool, rub out a little of the bottom section of hair so there are no hard lines (**Fig.26**).

Fig 26



27. Drag a Rectangular Marquee around the hair and go to Edit > Define Brush Preset. Make sure the layer you create your brush on has either a white or transparent background. That way, when we later paint our hair, we will be painting unique hairs onto the layer and therefore be able to extract an alpha channel which we can use for opacity in our 3D application to make the hair look realistic (**Fig.27**).

Fig 27



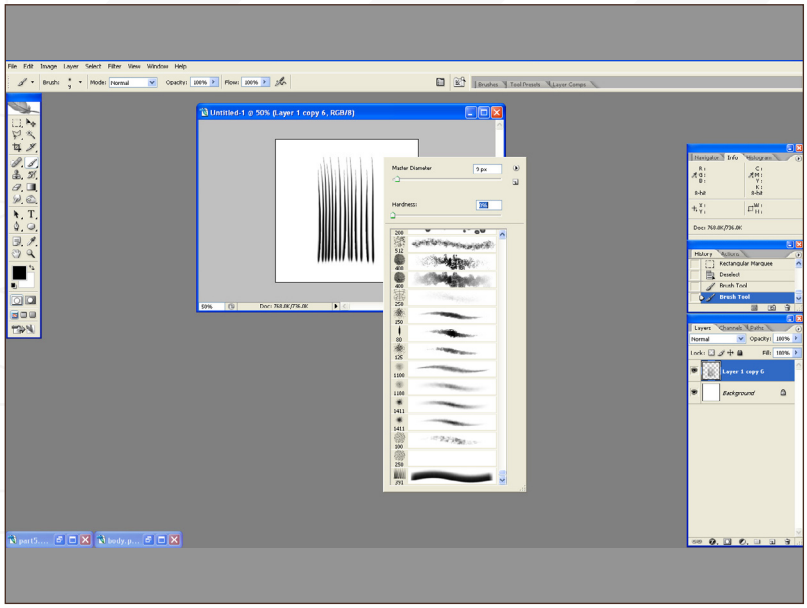


Fig 28

28. Commit to the brush preset and then right-click over your image. Scroll down the menu until you get to the very last brush, which will be the one we just created (**Fig.28**).

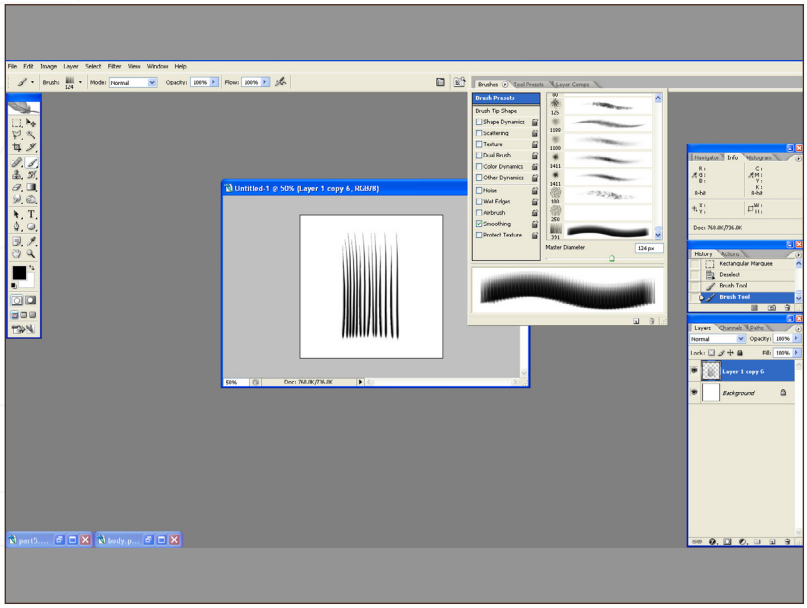


Fig 29

29. In the upper right of the screen there's a brush menu where we will edit the brush settings (**Fig.29**).

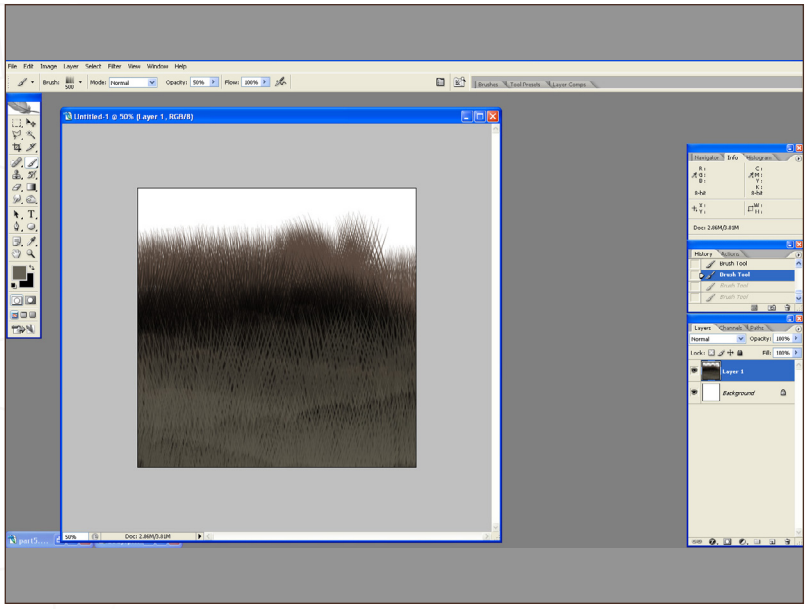
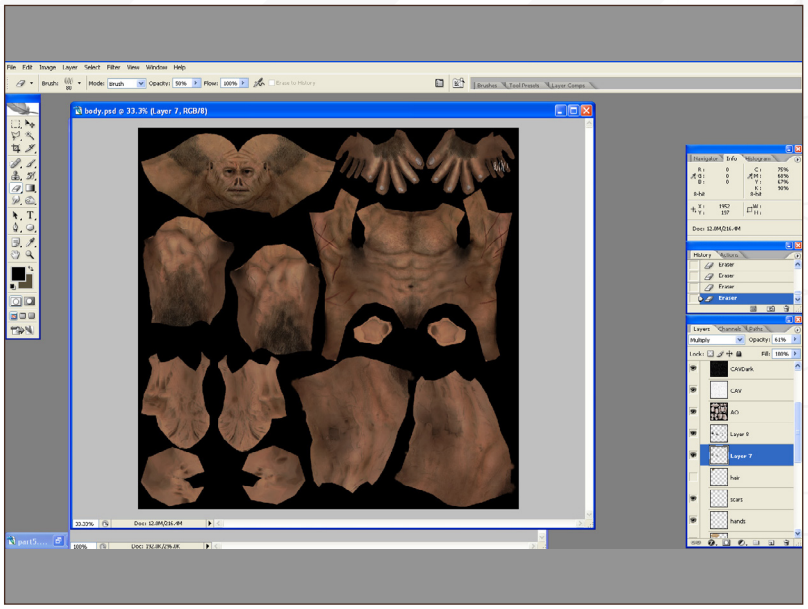


Fig 30

30. It is important here to make sure the brush has an organic feel to it by varying the opacity, size and angles. Copy the brush settings in the screenshot and try out your brush on the canvas. Important settings are under Shape Dynamics > Angle Jitter. We can change the Control to Direction so we have more control over how our hair is spread on the character. Optionally, we can also use the Color Dynamics to add variation in the hue and saturation, which will help immensely in quickly creating unique, natural, and believable results. We will also use Scattering to add multiple brushstrokes at once to build up hair much more quickly. The brush that we just created can be very useful for creating short animal fur. Try creating some new brushes in the same way but with a longer sample of hair, or with wispy, curly strands (**Fig.30**).

31. Create new hair brushes that are composed of smaller, thinner hairs and make sure the scattering and spacing allow for a much lower density of hair placement. Paint hair on the tops of the hands, palms, chest, back, arms, and legs. This kind of hair is thinner and wispier than the head and leg fur, and should remain quite light, darkening in areas where it would be thicker, such as underneath the armpits and in the centre of the chest. You can even create a brush of large curls that add to the underarms and crotch area to depict thicker hair. On a new layer below the shading layer, pick a bluish purple color from the color swatches and lightly paint over the veins in the body. The blue color simulates a little depth to the veins, even though they are sticking out of our model in the normal map (**Fig.31**).

Fig 31



32. Search online or create your own brushes that look like veins. There are plenty of vein brush collections for Photoshop online. You could paint your own, or create them from photographs. Apply this to the whole texture, creating veins wherever you feel the texture could use them. You can create mostly blue veins, but smaller red ones can offer variation (**Fig.32a – c**).

Fig 32a

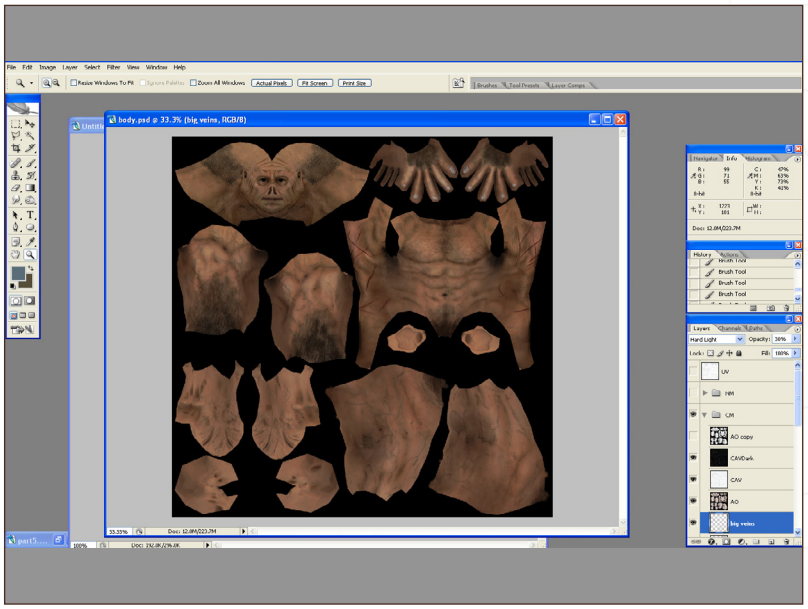
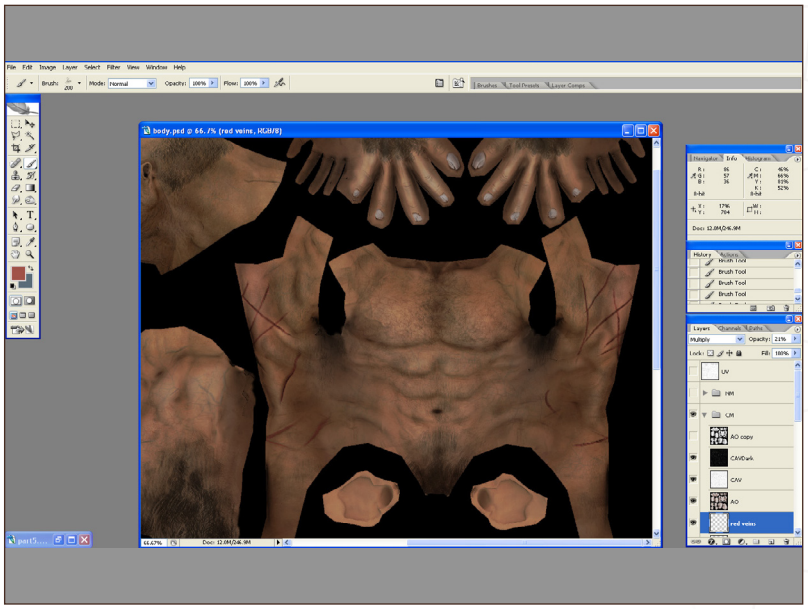


Fig 32b



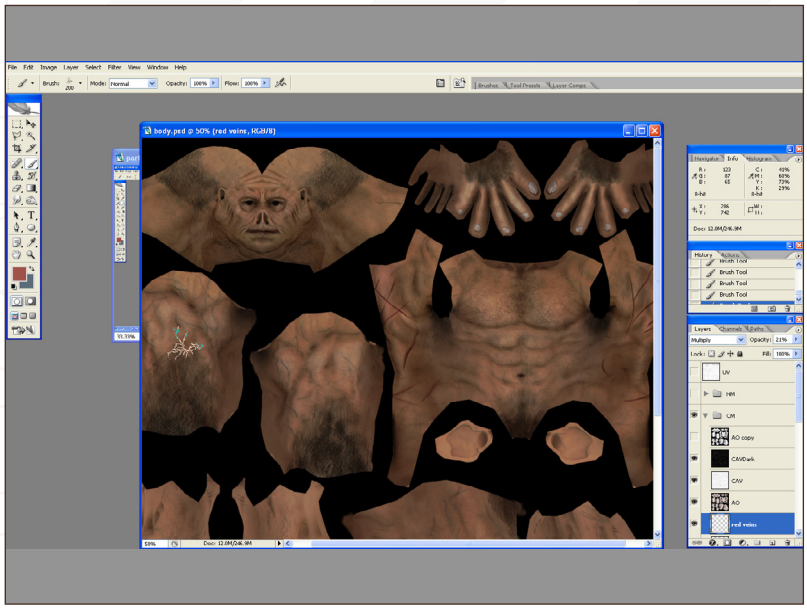


Fig 32c

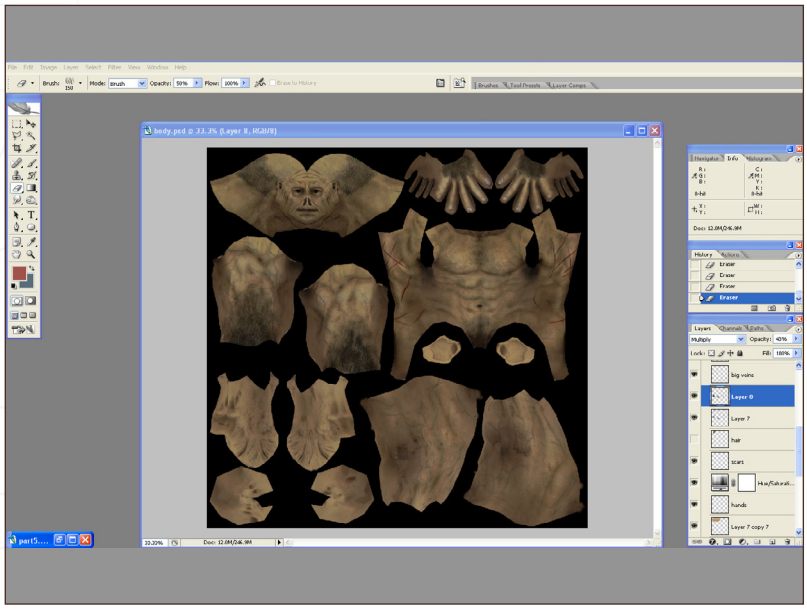


Fig 33

33. At this point I add an adjustment layer to control the overall hue and saturation of the character's skin. Click Layer > New Adjustment Layer > Hue/Saturation, and accept. Place this layer just above the photo reference layers we manipulated earlier. Click on left-hand box of the new adjustment layer to access the Hue/ Saturation controls. From here, adjust the sliders so that the skin tones of your character are closer to the greenish yellow of our concept, rather than the humanoid peach color (**Fig.33**).

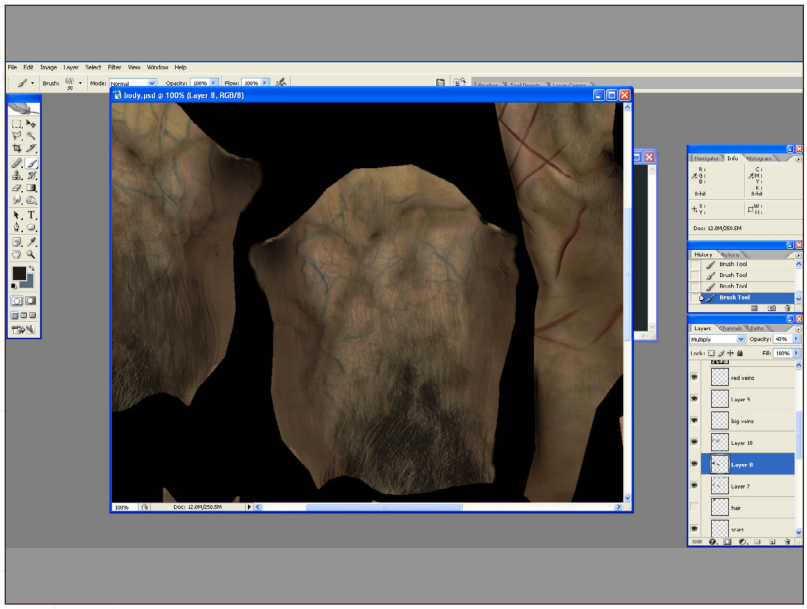
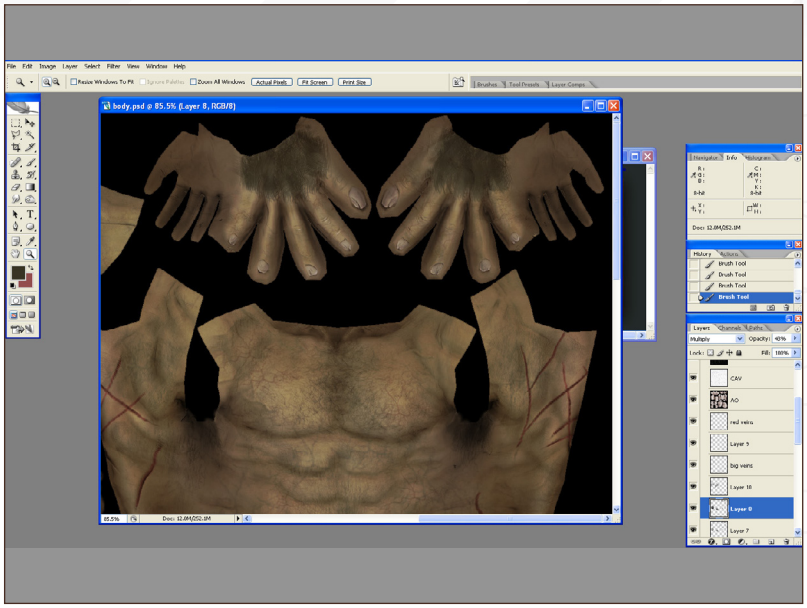


Fig 34a

34. Try to keep things like hair, veins, fur, and scars on separate layers. There's always the possibility that you come into work the next day and the character has changed to a hairless lizard man! It's no good if you've baked all of your veins, hair, and fur into the base texture, as this will simply result in a complete redo of all of your work. Art directors change their minds a lot and we have to be ready for that, so working in a non-destructive way pre-empts any possible changes. It also allows us to show different variations of the character – with and without fur, hairy or smooth, with lizard-like or human-like skin, and with different color tones. Whenever possible, try to work in a non-destructive manner. Find the layer that you painted the arm hair onto and darken it using the Burn Tool. The arms on our character are a lot hairier than the chest and back. The forearms will be completely

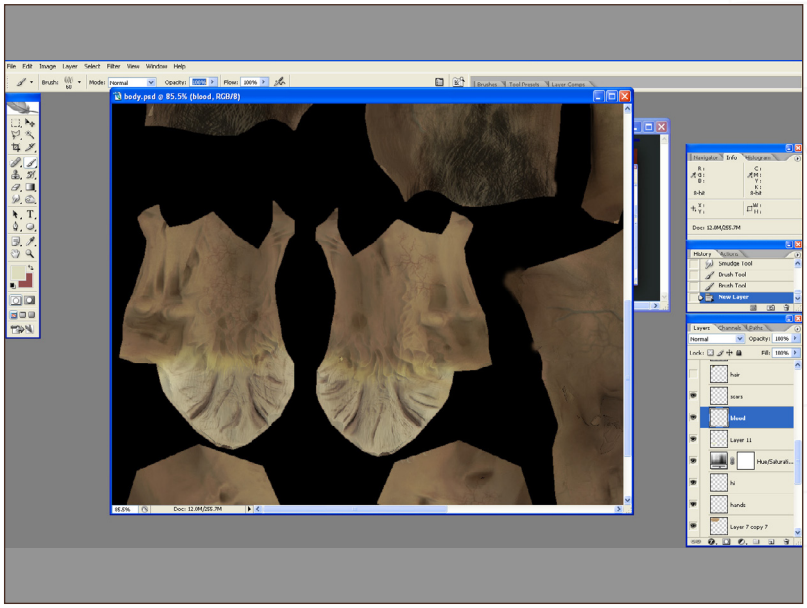
covered in hair by the end, so we need to suggest that in the upper arms before we paint the fur on the lower arms (**Fig.34a – b**).

Fig 34b



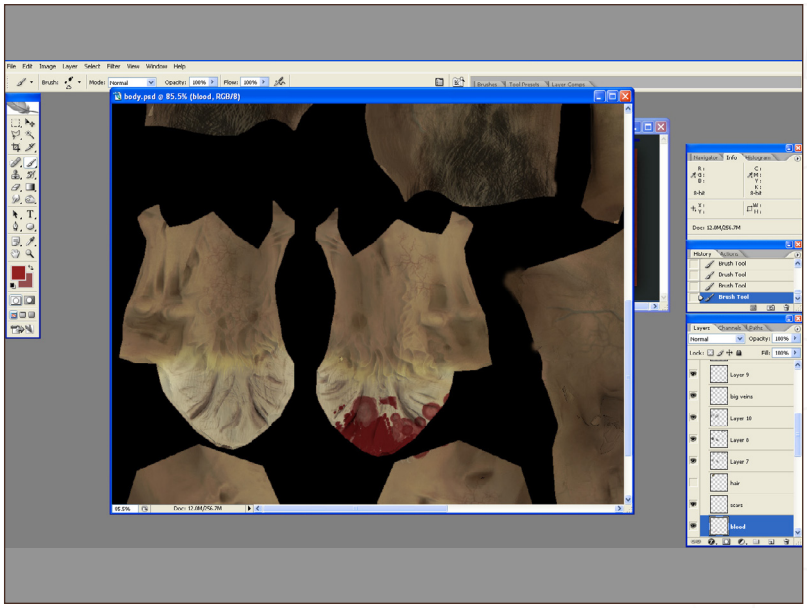
35. Move onto the feet now and in the base color paint a yellowish green for the hooves of the feet (**Fig.35**).

Fig 35



36. Find a picture of a blood splatter, paste it into the texture and set the layer mode to Darken. Erase any parts that might not fit and position it at the end of the foot. I want to add a little back story to the character, suggesting that in his escape he might have tripped and caught his foot on something or injured it somehow. I have also mixed this new reference with custom, hand-painted blood splatter marks (**Fig.36**).

Fig 36



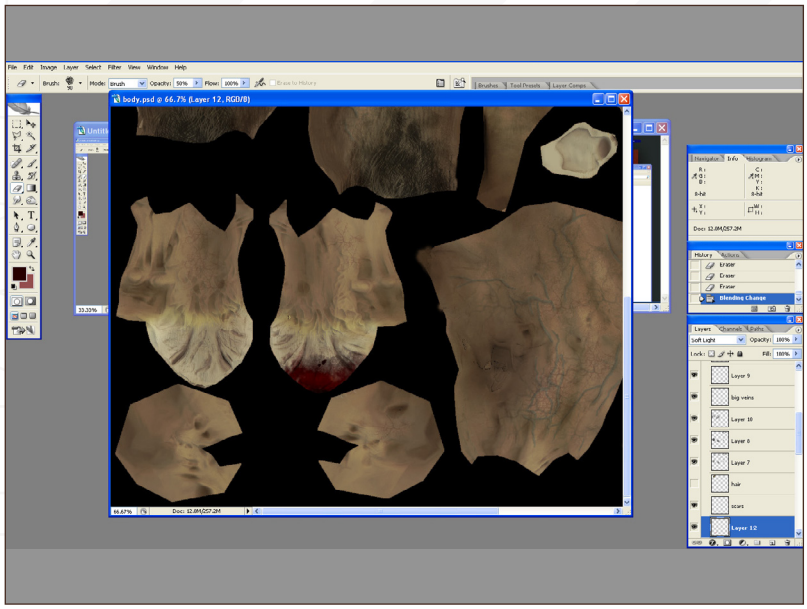


Fig 37

37. Position it correctly and blur around the sides of the blood splatter to make it look like the blood has soaked into the hoof, leaving one section looking like an open wound (**Fig.37**).

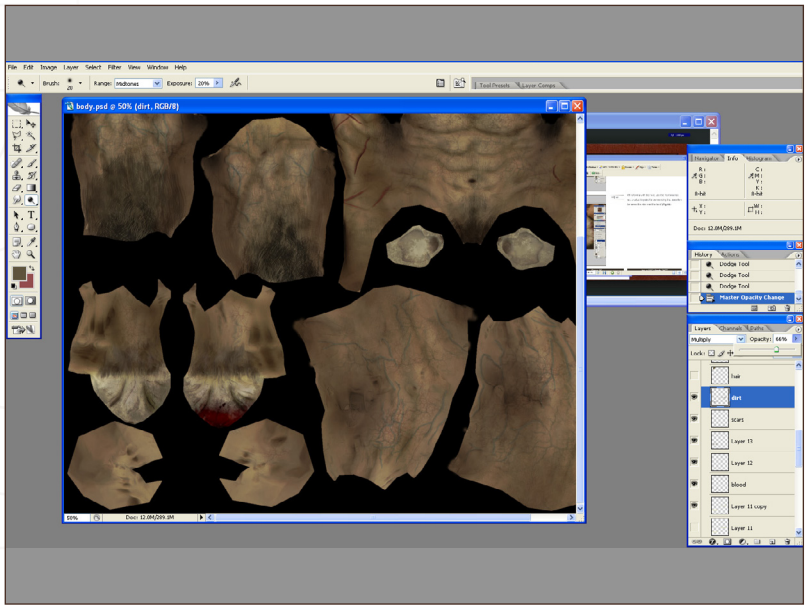


Fig 38

38. Staying with the feet, use the hair brushes we created to paint fur surrounding the transition between the shin and the hoof (**Fig.38**).

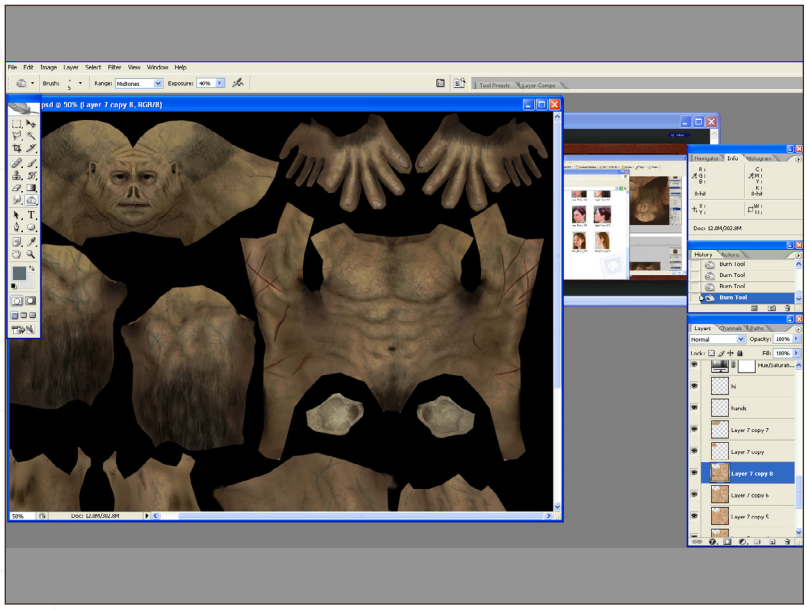
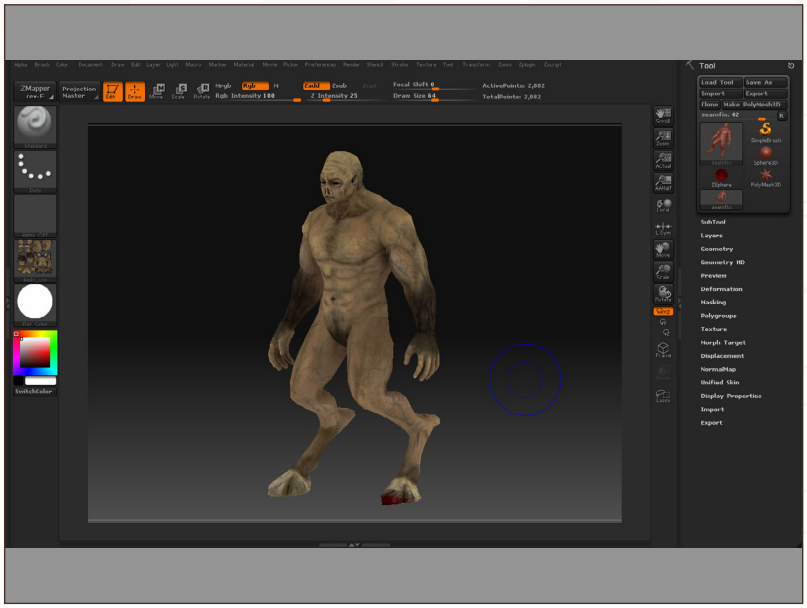


Fig 39

39. Paint hair in the same way on the forearms now. Remembering that the forearms join with the wrist, paint hair onto the front and back side of the hands near the wrist, so we can make sure that they match up (**Fig.39**).

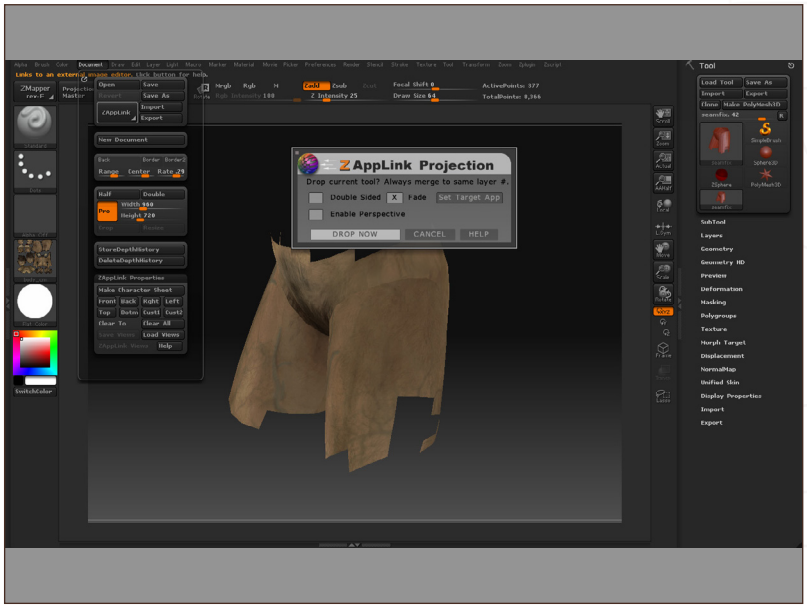
40. Now is a good time to paint out the seams on our character. It can be difficult to match photo sourced images across UV islands, not just because of uneven pixel distribution but generally matching information can be difficult. Even clone stamping can get messy and wash out detail that we have created. ZBrush has a very powerful method of painting out seems called ZAppLink – a plugin widely available through Pixologic. Open up ZBrush and load in the game character model. Now we can easily see some trouble areas on our model, namely the waist, shoulders and knees (**Fig.40**).

Fig 40



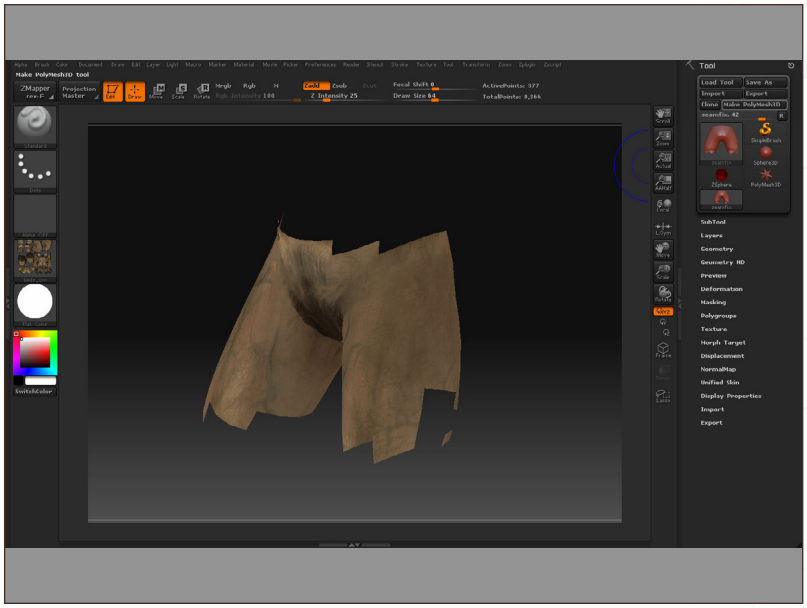
41. Section off an area you would like to work on; because the texture information is based on the polygons of our model it may be a good idea to subdivide the model once for this reason. Go to Document > ZAppLink. This will open a pop-up menu; enable Fade and click on Drop Now. By default, the target application is Photoshop; clicking Drop Now will screen grab the model, with texture and shading information split apart in a PSD, and will open it in Photoshop (**Fig.41**).

Fig 41



42. From here, we can clone stamp out the seams on the layer that contains our texture information, save the file and return to ZBrush. Click Re-Enter ZBrush. If that option doesn't appear, return to your PSD and make sure it is saved. The updated texture will load and press "Pickup Now." Instantly you can see the seams are no longer there. Continue this process throughout all trouble areas on your model. (**Fig.42**)

Fig 42



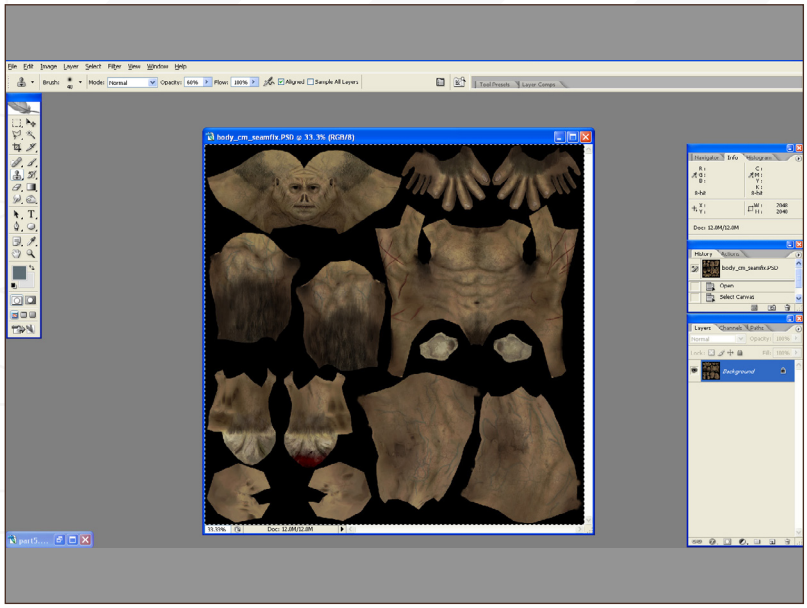


Fig 43

43. Export the new texture and import it back into Photoshop. This is our updated texture – seamless, and perfect for our in game asset (**Fig.43**).

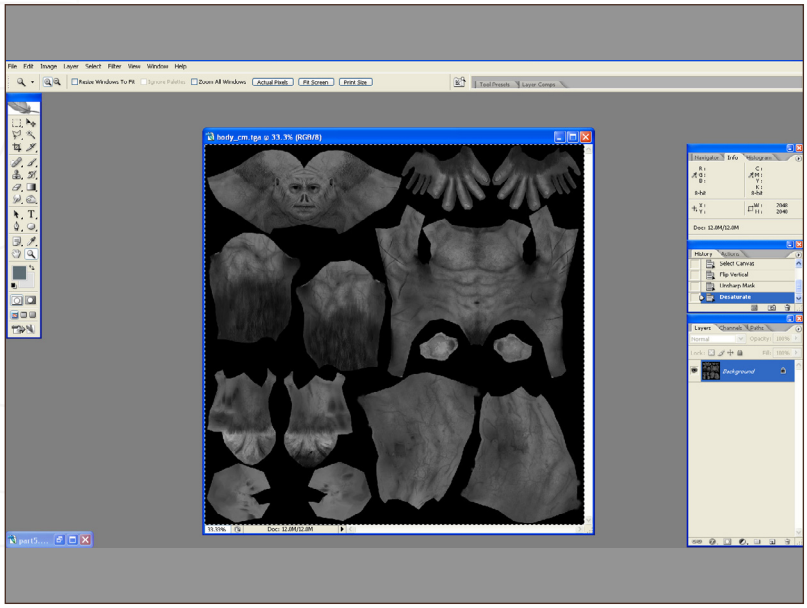


Fig 44

44. Now we are going to create our specular map. A specular map is generally used to tell the shader how bright the specular should be in a certain area of the map. Areas inside of the nostril, of stubble or fine hair, and otherwise dry parts, will not be as reflective as parts such as the ears or lips. We need to communicate all that information in a map, which is why we have the specular map.

Start off by taking off the grey cavity layer and duplicating it. Move it up into the specular map group. Now click Filter > Sharpen > Unsharpen Mask to apply a Sharpen filter to the layer. This brings out more detail in our map. Most of the effects we will do during the creation of the specular map will be fairly basic adjustments to brightness and contrast (**Fig.44**).

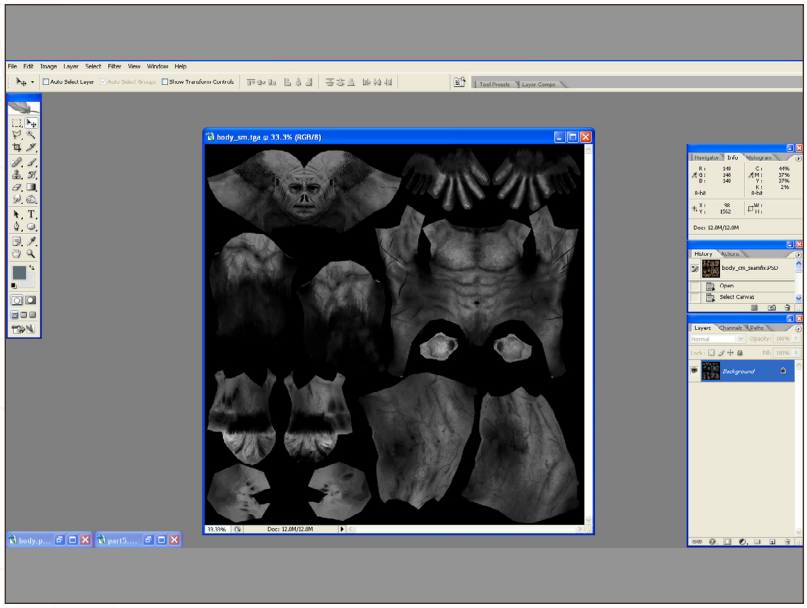
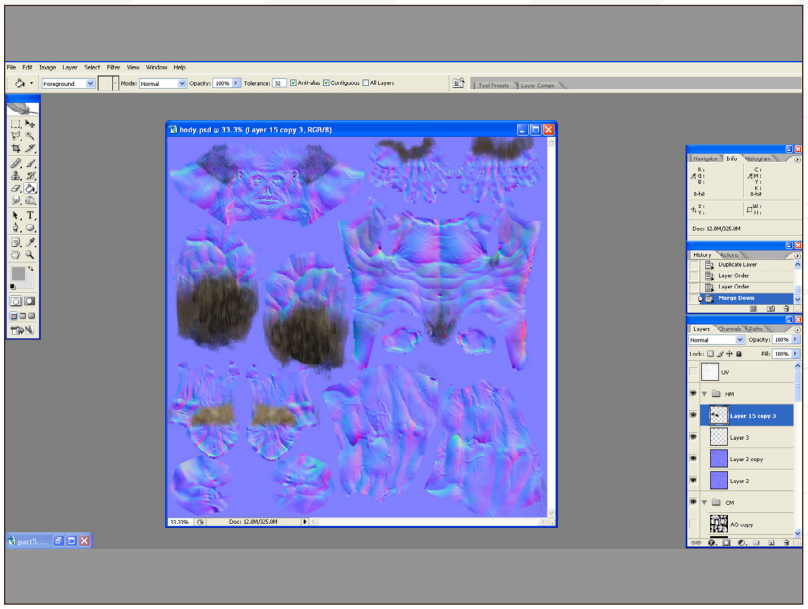


Fig 45

45. As mentioned previously, simply adjust the brightness and contrast of our desaturated texture. The general idea here is to darken our shadows and to make the highlights stronger. Be careful not to go too strong with the blacks and whites of our texture as it could give a flat or plastic effect. Bring any extra detail that we have created, such as the hair, merge the layers together, and make sure to desaturate them. Like the main texture, adjust the hair brightness and contrast to bring out some highlights and to darken our shadows. Generally, we don't want too much specular in the hair areas as this will cause a plastic effect if they are too strong (**Fig.45**).

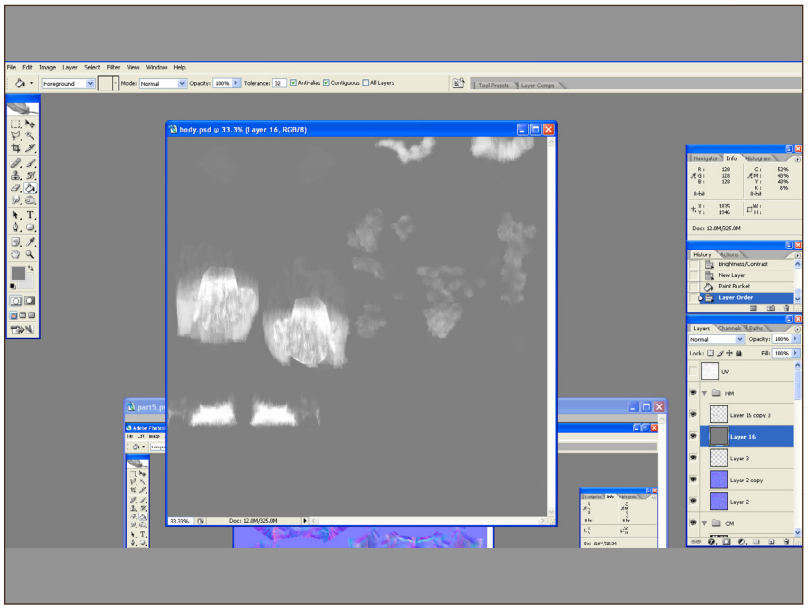
46. Now we are going to create extra detail in our normal map. Like we did with our specular map, bring a duplicate of our hair detail over our main normal map layers (**Fig.46**).

Fig 46



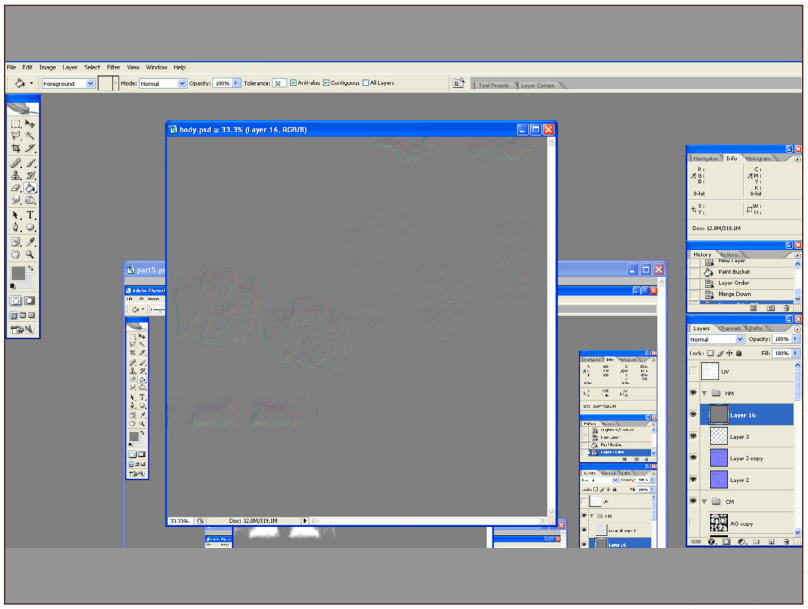
47. Add a neutral gray texture (128,128,128) under the hair and desaturate the hair level. Increase the brightness of the hair to mostly pure white. In this case, white will equal detail that is raised and black will equal detail that is pushed in. Merge these two layers and blur them slightly. The blurring effect will allow a more natural stepping in detail levels rather than a harsh line (**Fig.47**).

Fig 47



48. Assuming you have the Nvidia filters installed for Photoshop, with the layer selected, select Filter > Nvidia Tools > NormalMapFilter. Select the Du/Dv option with a higher scale than 1, such as 5; Average RGB and Alpha Field > Unchanged. Click OK. The expected result should be a grayish green colored map. This will look strange at first but will blend properly with the underlying normal map when the blending mode is set to Overlay (**Fig.48**).

Fig 48



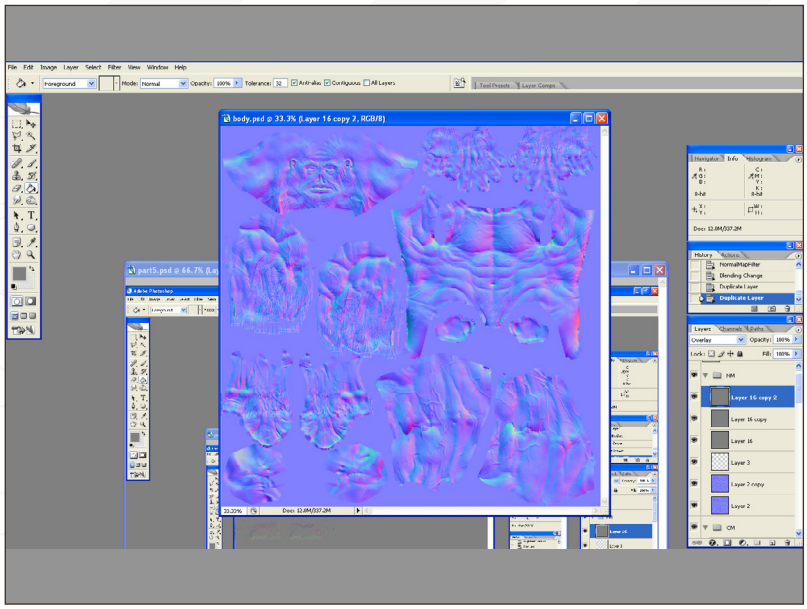


Fig 49

49. Set the layer to Overlay (**Fig.49**).

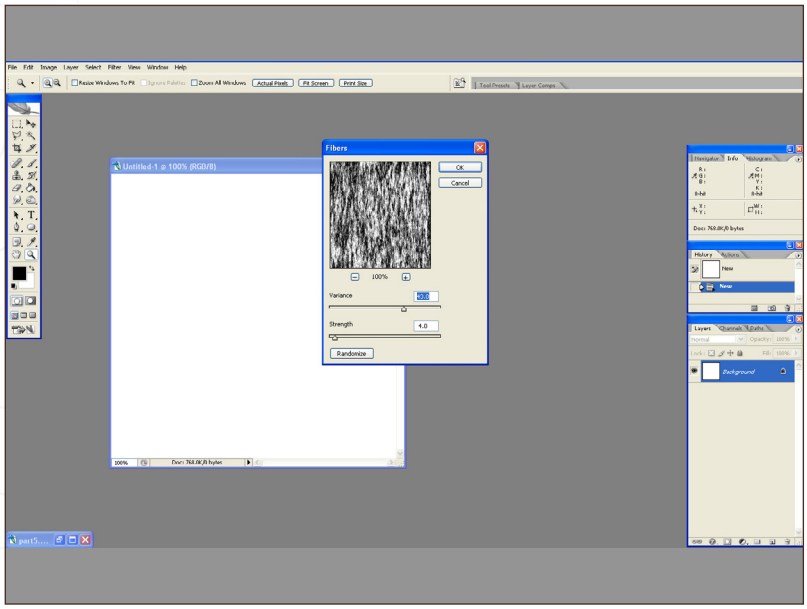


Fig 50

50. Now we are going to create the eye texture for our character. Create a new document with a width and height of 512 pixels. Now create a new layer. Click on Filters > Render > Fibers and choose a reasonably high variance, a small strength, and then click OK (**Fig.50**).

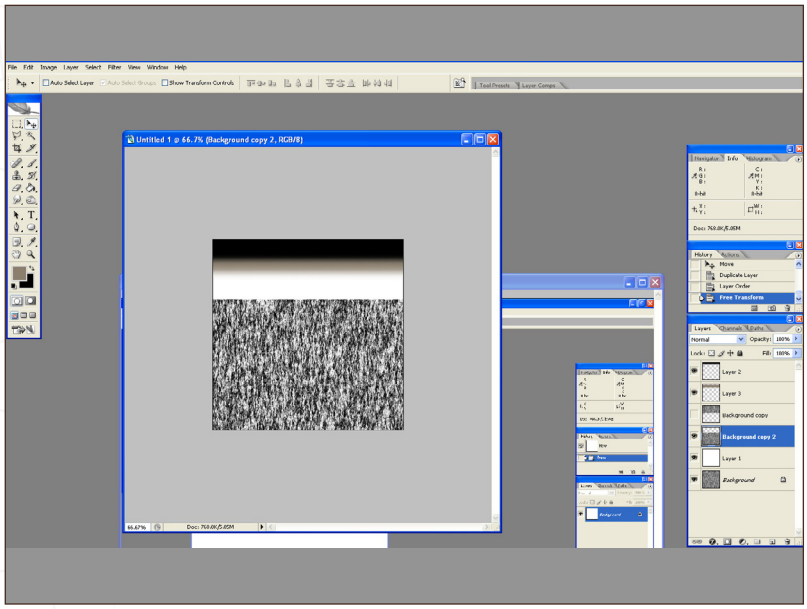
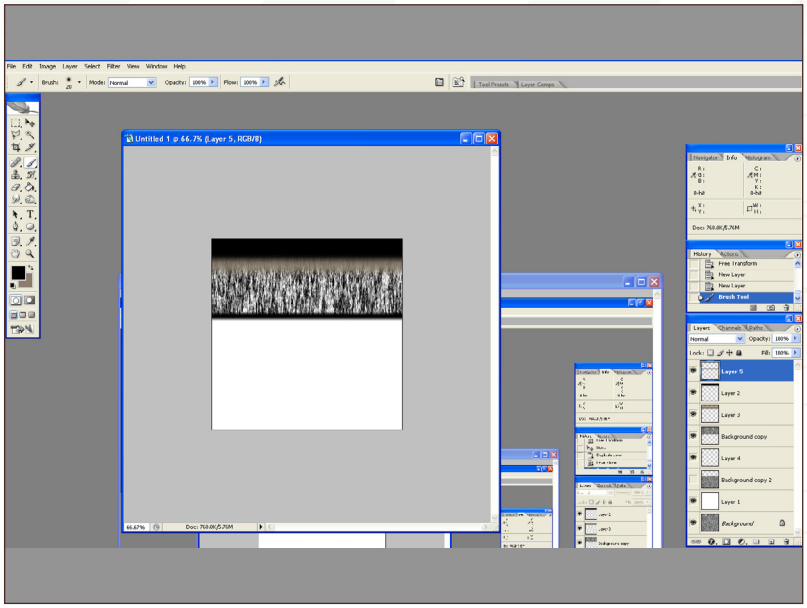


Fig 51a

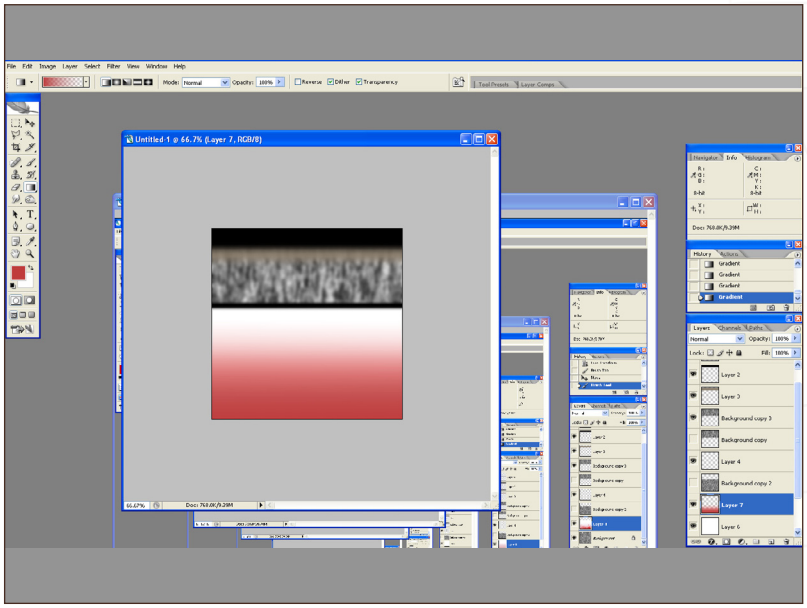
51. The Fibers filter is a quick way of creating some random streaks of noise that look somewhat organic. Create another new layer. Use the Free Transform tool to scale them down vertically from the top, and now, in that gap, paint a large line of black to be our pupil, and a smaller line underneath of brown (**Fig.51a – b**).

Fig 51b



52. Select the layer with the fibers on and blur it considerably. On the background layer, choose a pinkish foreground color and create a gradient from top to bottom – the bottom being the pinkest and the top being white (**Fig.52**).

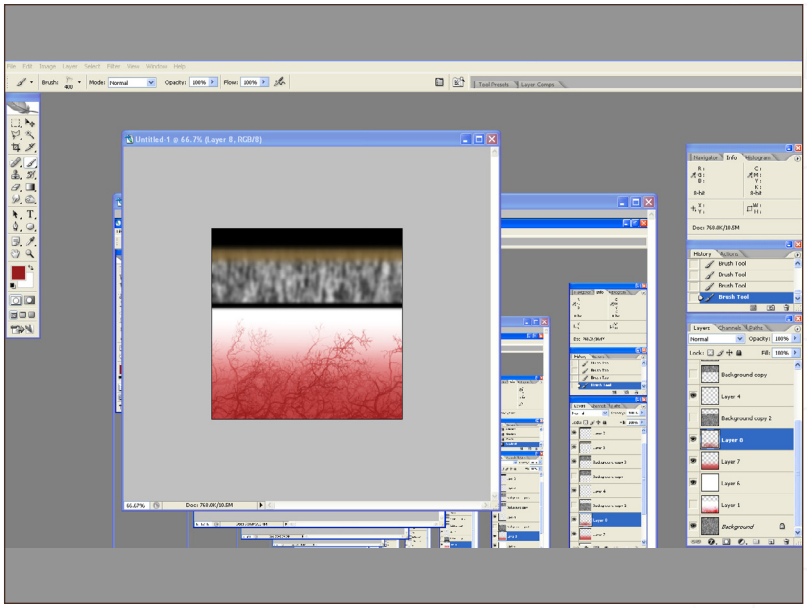
Fig 52



53. Create a new layer above the background layer. Choose a deeper red and, using our vein brushes, scatter some veins around – the bottom containing the most veins and the top the fewest. Merge the lines and fibers layers and use the Free Transform tool to scale them vertically slightly (**Fig.53**).

54. Now with the fibers section scaled, retain the selection, and in a new layer create additional fibers. We can reduce the contrast of these and use a layer blending mode to put back some of the sharpness. Using the paintbrush, hold down Alt, right-click over the texture and choose Color. With this mode enabled you can paint over your image altering only the color, without painting over any of the details. Give a little randomness to the fibers' colors now (**Fig.54**).

Fig 53



55. Now we've created a simple map for our eyes, which we can go into more detail on later if we wish. Something of this caliber will usually suffice when the texture resolutions for eyes are considerably small, because they do not take up too much resolution on screen. Merge all of your layers together by selecting the top layer and going to Layers > Merge > Visible. Now with the layer selected, go to Filter > Distort > Polar Coordinates and make sure the setting is on Rectangular to Polar; click OK (**Fig.55**).

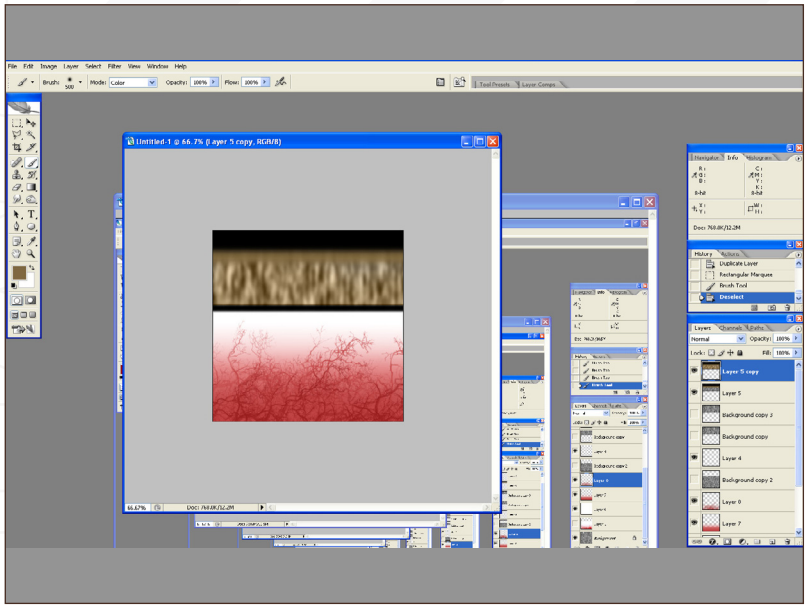


Fig 54

56. Generally, apes' eyes are somewhat darker and more orange than humans', so let's paint that now. Create a new Saturation layer and tint the texture orange. Then paint a darker orange color in a new layer above that, and set the layer blending mode to Linear Burn. Create layers above that to darken and add volume to the eyeball texture. You can also paint a ring around the iris in black and apply a strong Gaussian Blur filter to this, and reduce the opacity a little. This gives the effect that the iris is actually a separate object underneath the cornea; the black ring simulating the shadow cast. Save off this file now as our eyeball texture (**Fig.56**).

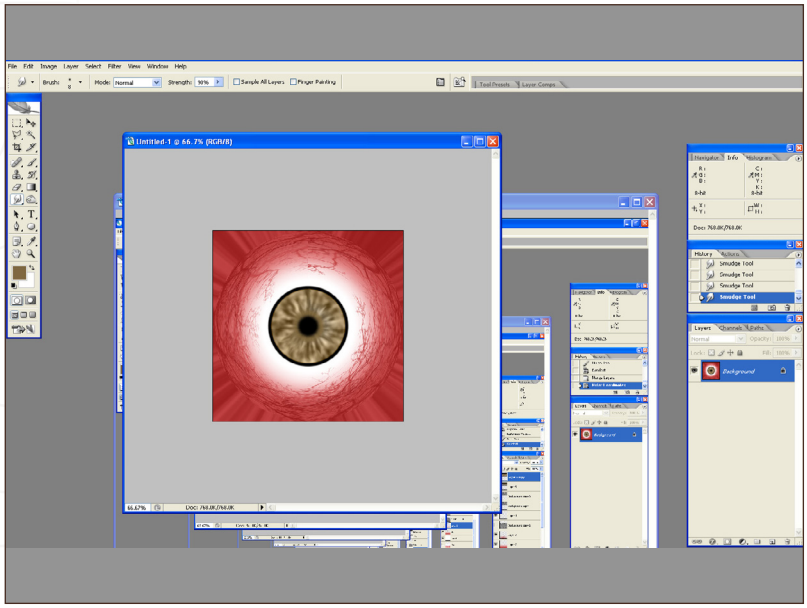


Fig 55

We finally come to the end of the texturing process. We've created the majority of maps necessary for building a realistic and professional shader. The texturing process can sometimes be long and arduous, but with the techniques we have used here it can be quick, efficient, non-destructive, and manageable. In the next installment we will create a basic 3-point lighting rig and an advanced character shader, along with hair and eyes. We will also look at realtime rendering options in Maya and complete our character with some accessories and a weapon.

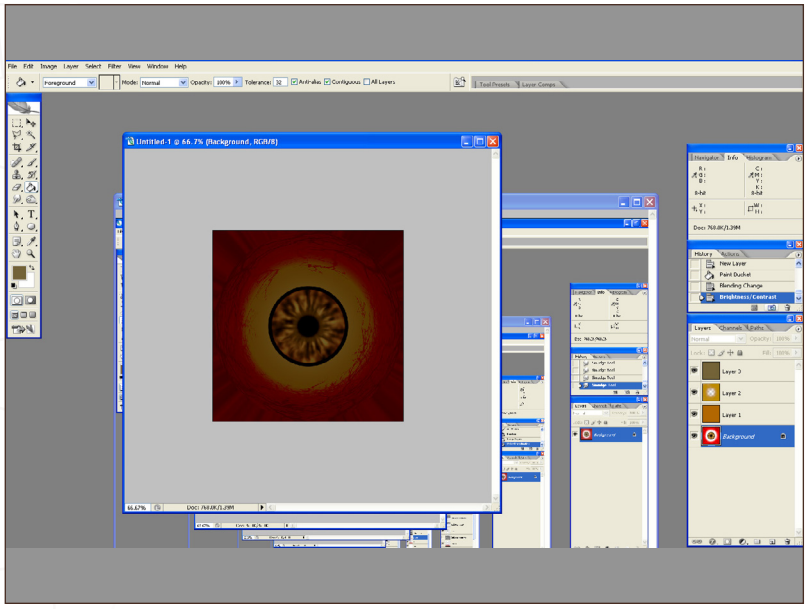


Fig 56

Creature Concept by: Richard Tilbury
Tutorial originally created by Joseph Harford in ZBrush & 3ds Max; translated by Gavin Goulden for Maya

Tutorial by:
GAVIN GOULDEN
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Chapter 1 – Low Poly Modelling | Jul 09

Chapter 2 – High-Poly Modelling Part 1 | Aug 09

Chapter 3 – High-Poly Modelling Part 2 | Sep 09

Chapter 4 – Mapping / Unwrapping | Oct 09

Chapter 5 – Normal Mapping – Texturing

This chapter deals with the texturing part of the series and looks at how to generate normal maps, baking out lighting effects, and the techniques of painting in Photoshop using the aid of photographic reference. Seamlessly blending in photo references with hand painted techniques are a feature, as well as a section on painting eyes.



Chapter 6 – Materials, Lighting & Rendering | Dec 09

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- Free Low Poly Base Mesh & Textures

CHAPTER 5 - MAPPING / TEXTURING

Software Used: modo, ZBrush, Photoshop

INTRODUCTION

In the previous part we looked at UV-unwrapping our character. This month we'll follow on from that by generating normal maps, ambient lighting maps, and creating our textures using modo's 3D Paint, and Photoshop. Normal mapping used in videogames is the process of transferring detail of a high-polygon mesh to the surface of a low-polygon mesh. The computer-calculated map alters the surface normals of a mesh to visually make the low-poly object look like the high-poly object without adding any more polygons or changing actual polygon structure. The result is that the low-polygon object's surface will appear like the surface of how the high-poly would look under the same lighting. The normal map we will create will have RGB values containing height information along the XYZ axis. Both ZBrush and modo can generate normal maps, but we will use modo for almost all rendering since it is important that the detail in the maps line up exactly. If we were to render the different maps using different software packages, the process is slower and the resulting maps might have detail that is not all aligned with each other.

Fig 01

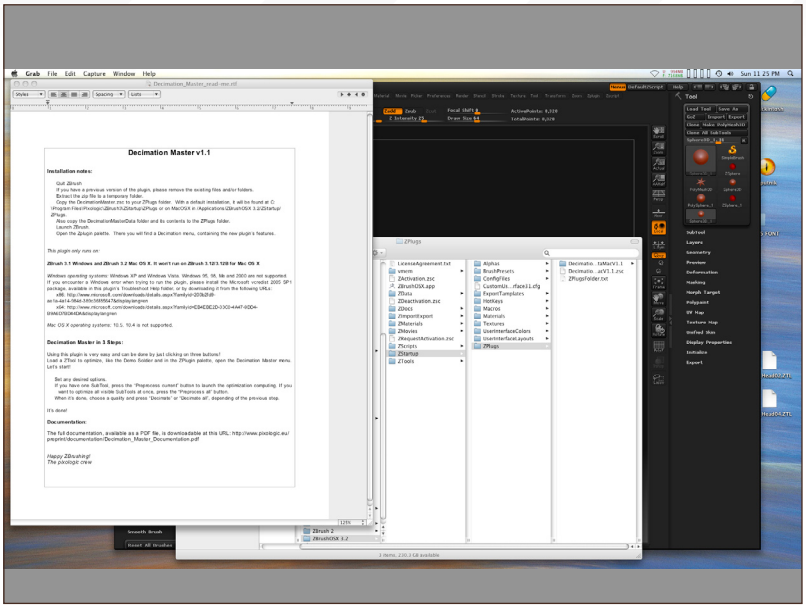


Fig 02

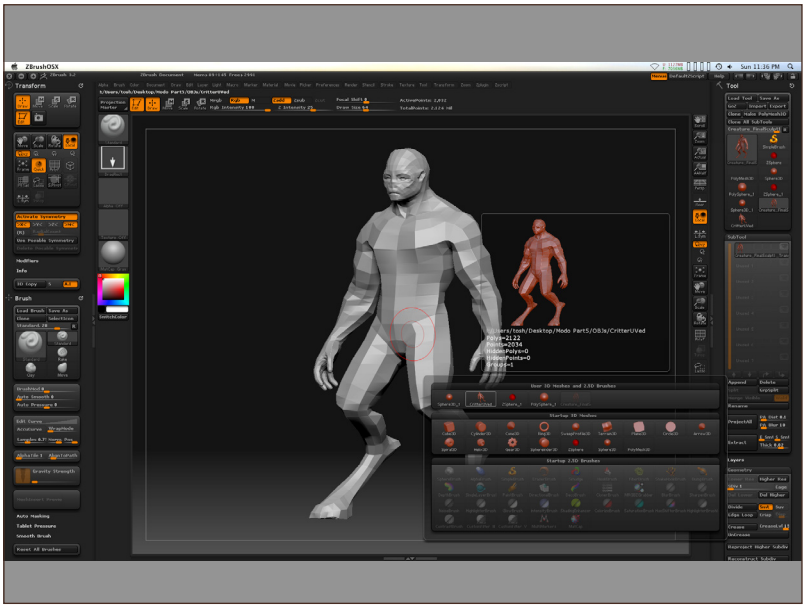


Fig 03



1. Since we are exporting our high-res ZBrush model out for most rendering, we will be using the free ZBrush Script, **Decimation Master**, to create a copy of the high-res mesh that will import much more easily into modo.

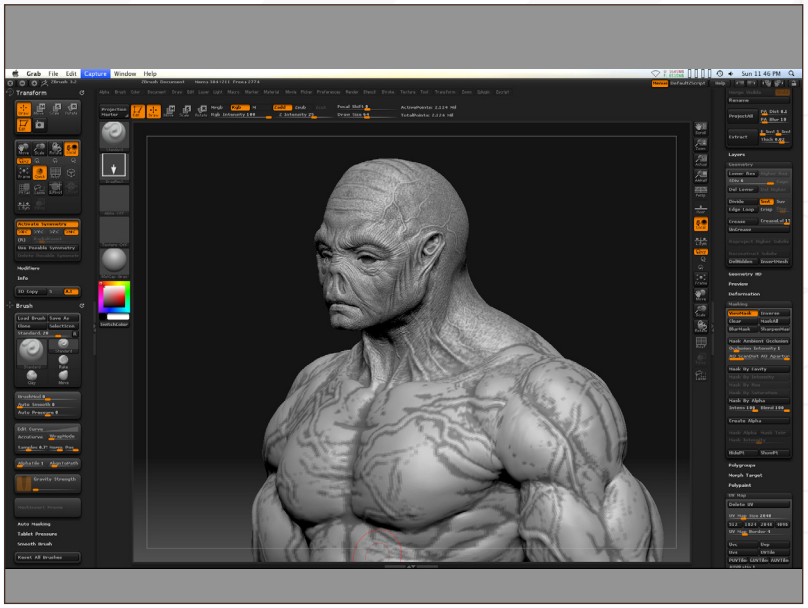
Make sure ZBrush is shut down and then go to **http://www.pixologic.com/zbrush/downloadcenter/zplugins** and download and install Decimation Master into your ZBrush scripts directory (**Fig.01**).

2. We will be using ZBrush to help detail our final Ambient Occlusion map, so the UVs must be the same for the high and low resolutions of the mesh. We will therefore need to project the

detail from our completed high-poly sculpt onto a divided version of the UV-mapped low-poly mesh to create a new high-res mesh.

Our first step is to load up the model in ZBrush as normal, using the Tool > Open menu. Drag the model onto the canvas and press Q on your keyboard to make it editable. Drop down to the lowest subdivision level by pressing Shift + D. Now switch to the ZSphere tool. Go to Tool > Import and import the final unwrapped character mesh from last the last tutorial chapter. With the low-poly model imported, switch back to the original high-poly sculpt and expand the SubTools palette. Click on Append and select the newly imported low-poly model (**Fig.02**).

Fig 04



3. Under Geometry, click on Divide and match the resolution of the original. The original high-poly sculpt had 6 levels of subdivision, so divide the new mesh to that level also. Hide the eye model by clicking on the eye icon on the right of the SubTool. Make sure your new model is selected. You can see which SubTool is active as its name will be darker and the SubTool ringed with a border. Now click on the button labeled “Project All”. This will project all the detail from our high-poly model onto our low-poly one. If you kept other SubTools visible it would project those onto the new model also, so it can be useful to create single meshes in many situations. Projecting all can take some time depending on the amount of polygons in your mesh (**Fig.03**).

Fig 05



4. Once the projection is complete, delete the original high-poly sculpt and you’re left with what is hopefully an identical version with our new final unwrapping. If there are areas where a few polygons are sticking out or have gone astray, use a Standard brush and smooth them back into place. Sometimes you may need to re-sculpt small areas, but usually the projection is quite accurate. It can help to open up the Brushes menu and turn on the Cavity Mask, which will retain any surface detail you may have added already whilst allowing you to work on the mesh (**Fig.04**).

Fig 06

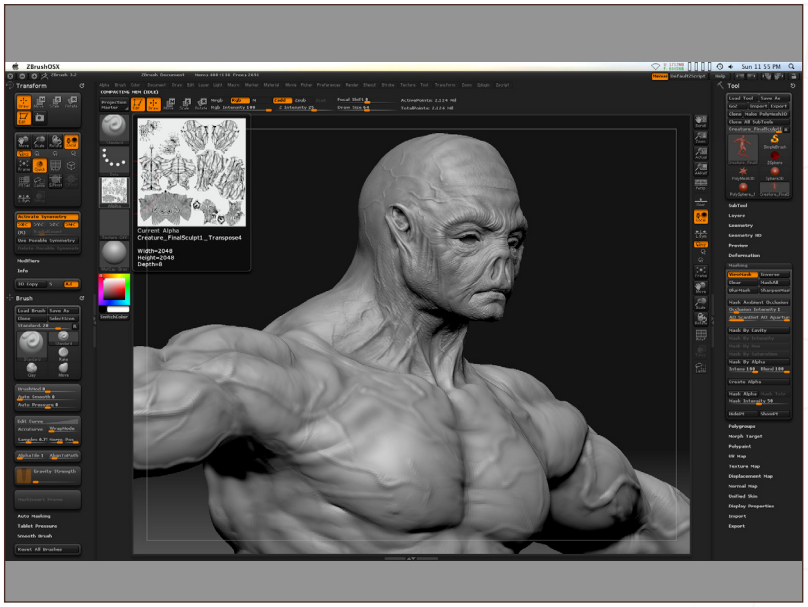




Fig 07

5. Next, we will re-pose the mesh in ZBrush to help reduce rendering errors by slightly moving the arms, legs and fingers to remove any overlapping or surfaces that are very close to one other. Since we are in of ZBrush and our low- and high-poly models are essentially both the same, this is a surprisingly easy adjustment! Simply drop to a low subdivision level and, using the Transpose tool, straighten out the leg slightly and raise the arm up a little. I know what you're thinking: "I don't want to destroy my mesh!" Well, under the Tool > Morph Target palette, before you start to transpose, hit the button labeled "StoreMT". We have now stored a Morph Target, so after rendering maps we can drop back to it as if nothing has happened.



Fig 08

Go ahead and make the changes to the model using Transpose by moving some limbs out of the way (**Fig.05**).

6. Now go to the "Texture" menu at the top and set the texture size to 2048 by 2048. Once complete, generate a cavity map, generate an alpha, and then export the cavity map as "CreatureCavity". Go back to the Tool > Mask menu and blur the cavity mask once, and then create and export another cavity/alpha texture named "CreatureCavityBlur" (**Fig.06**).

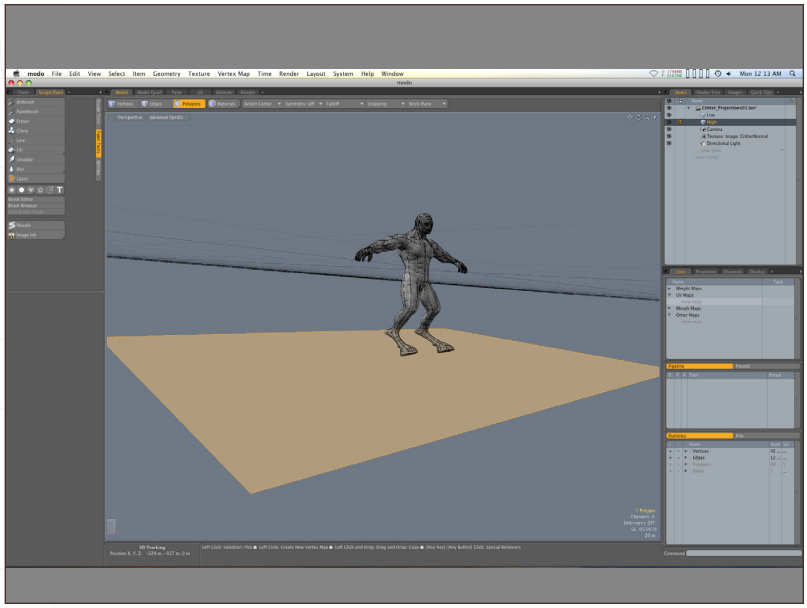


Fig 09

7. Clear the mask, as we will now export both a high-res detail source mesh and low-res detail target mesh. Switch to your lowest subdivision level and export this model to a separate folder. To prepare the high-res for export switch back the highest-resolution and run the Decimation Master script under the Zscript menu. Leave the settings at default and click the Preprocess Current button. Then click on Decimate Current; this will create a high-res mesh that has all the surface detail but considerably fewer polygons and a smaller file size. Be careful to save this as a separate file because once the mesh is decimated it cannot be reverted back.

These meshes will be used to calculate our light baking or ambient occlusion maps from within

modo. We export these models because, in order to create good optimum maps, the low- and high-poly models should line up reasonably well (**Fig.07**).

8. Switching to modo now, start a new scene, import both the high- and low-res meshes and assign separate surfaces to them (M key). It is good not to have them sharing the same surface since we will apply the textures and we don't want any textures on the high-res mesh.
Set the Smoothing Angle for both materials to 180 degrees; we want both surfaces to contain no hard edges. If you find that the object displays strangely the mesh might have a vertex map attached, so go to Lists > Other Maps and delete the map listed. At this time you may wish to delete the UV map on the high-res mesh, if there is one, since it won't be needed and meshes without UV maps are smaller in size (**Fig.08**).

9. In a new mesh group, create a small ground plane below the feet of the high-res mesh. Then go to Lists > UV Maps and delete the UVs for the ground plane, as we don't want its UVs to interfere with the character's UVs.

Now cut and paste the ground plane into the same layer as the high-res mesh. When we render, the Ambient Occlusion map needs some light to be blocked from the bottom to help add some shadow detail to the surface (**Fig.09**).

10. In the Shader Tree tab, click and open Render and add a new Render Output; change its effect to Ambient Occlusion. Disable the Final Color output and Alpha output as we won't need them at this time and it will speed up the rendering speed and memory usage.
In the properties window for Render, change Frame size to 2048 in width and 2048 in height (**Fig.10**).

11. Next add an Image Map layer, save it at 2048 by 2048 in size, and then change its effect to Normal. Make sure that only the high- and low-res mesh layers are visible with the low-res

Fig 10

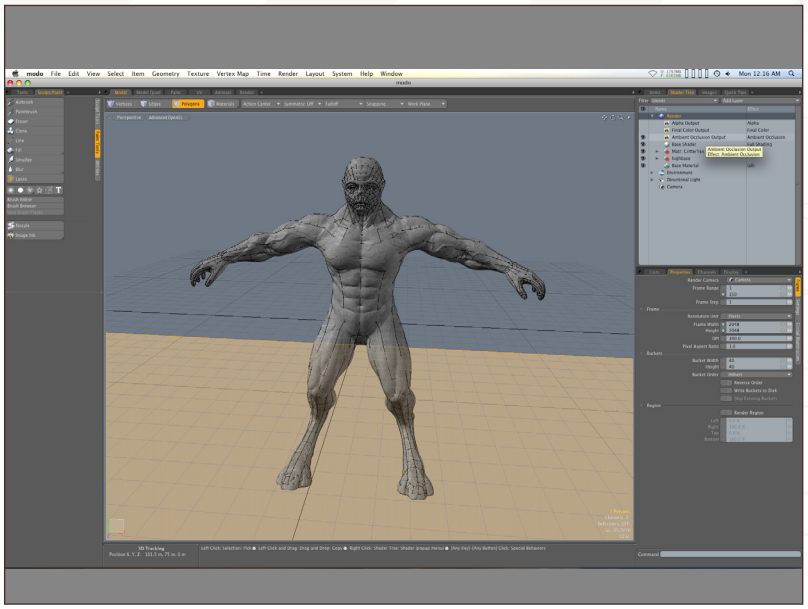


Fig 11

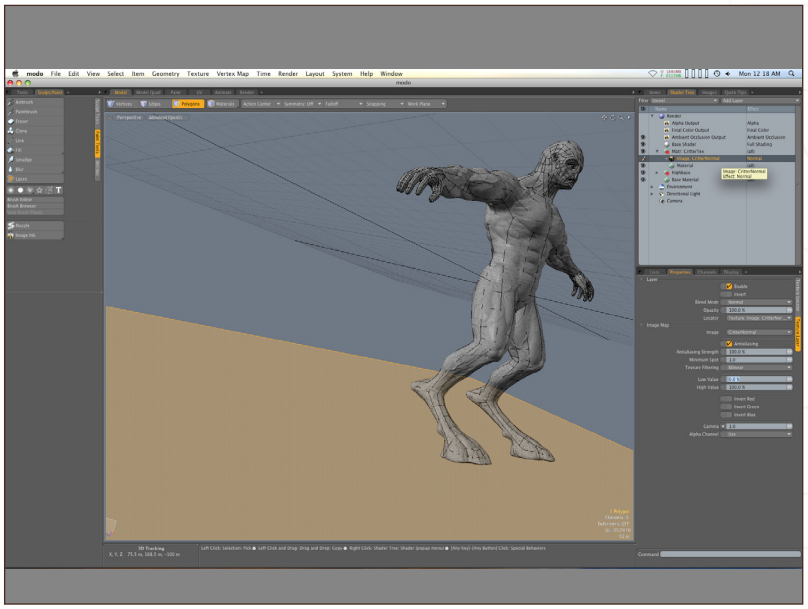
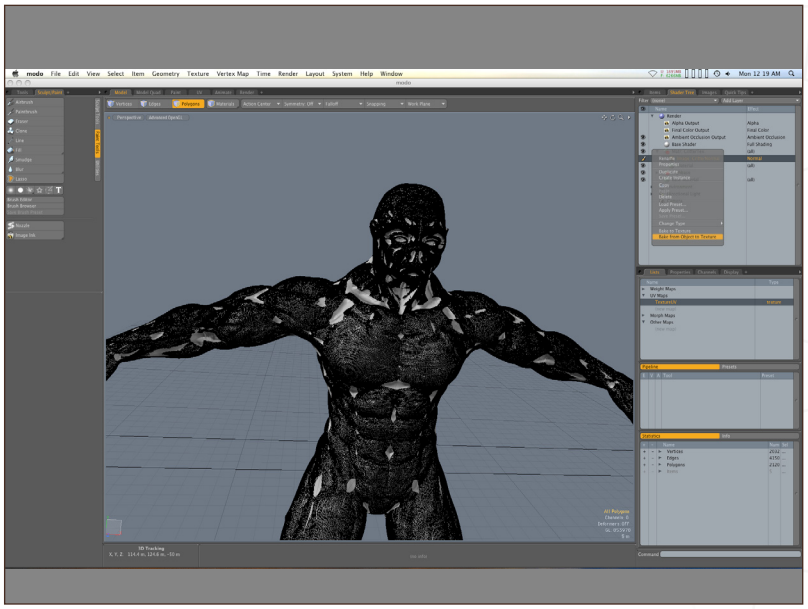


Fig 12



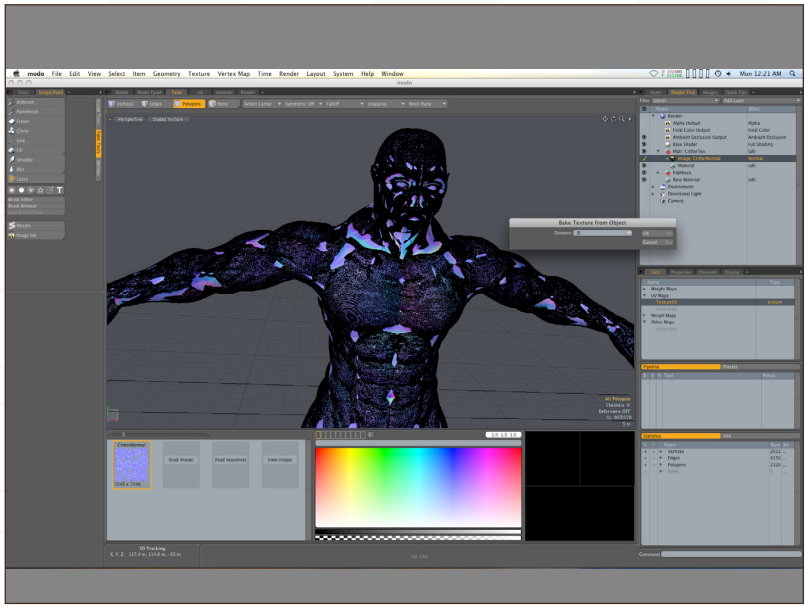


Fig 13

mesh selected. We are now setup to render out the Normal and AO maps (**Fig.11**).

12. With the Normal texture selected, right-click on it and select “Bake from Object to Texture”. This will transfer the high-res detail from the background unselected mesh to the foreground active mesh (**Fig.12**).

13. A popup box will come up – enter a value of about .5m. We need to define a distance to make sure all the surface detail is transferred properly – not too far that it may create errors from other surfaces nearby, and not so close that some detail gets clipped out. Save the image that gets rendered as “CreatureNormal01”, and if you get any errors, re-render using a different value and save that map as “CreatureNormal02”. Later in Photoshop we can select the best map and use the other renders to patch over any rendering errors (**Fig.13**).

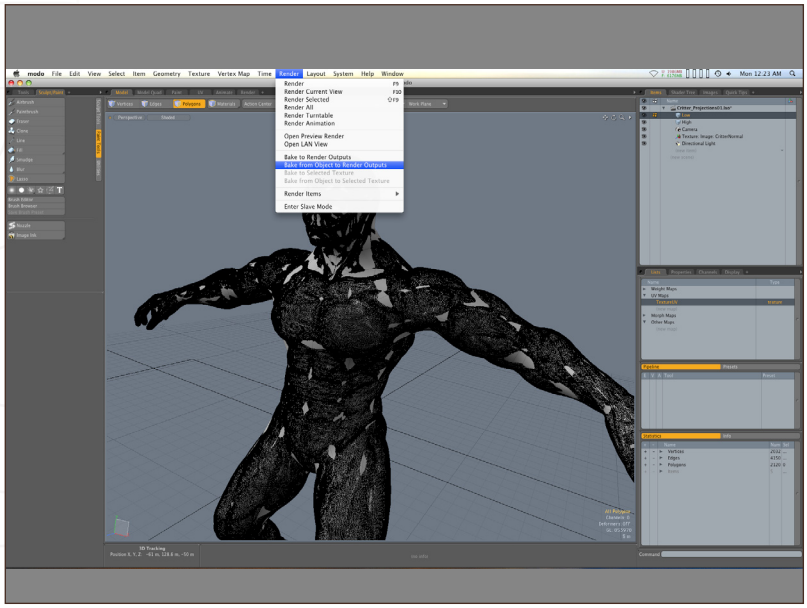


Fig 14

14. Now go to the top Render menu and select “Bake from Object to render outputs”. For the popup box, enter a similar values to what was used to create the normal map; they do not need to be exactly the same and might work better at different distances. You may have to re-render a few times to get the best results – also change the value to create patches to use later (**Fig.14**).

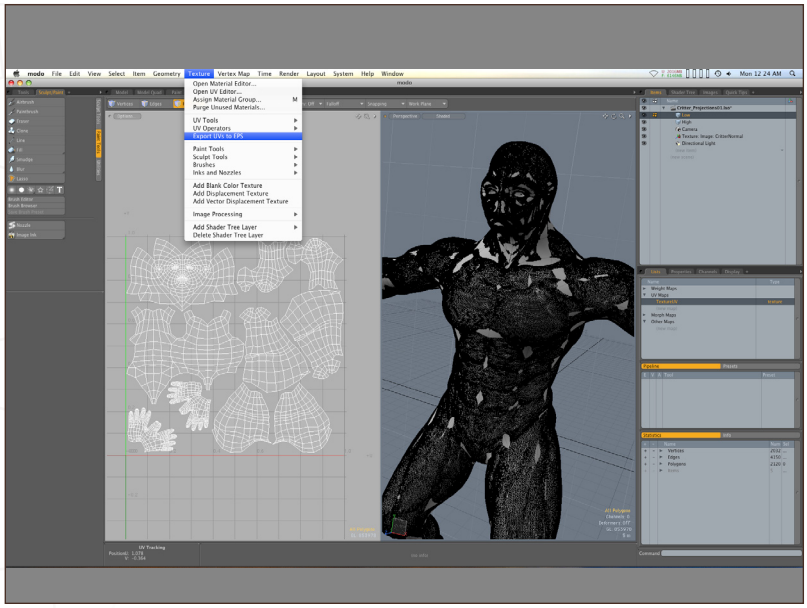


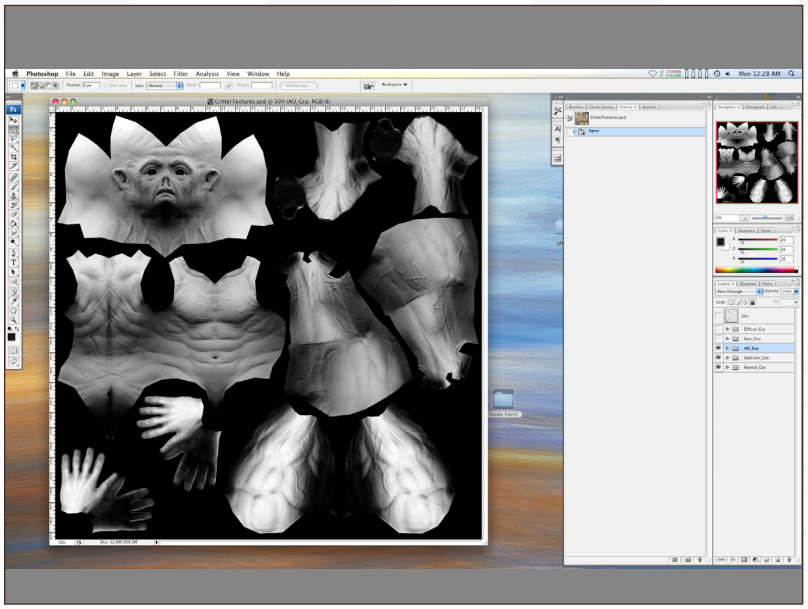
Fig 15

15. Finally, we need a UV map as a reference in Photoshop. With the UV map selected in the Lists tab, go to the top Texture menu, select “Export UVs to EPS” and save the file as “CreatureUVs” (**Fig.15**).

16. Now that we have several Normal and Ambient Occlusion maps created, we need to clean up any rendering errors and remove UV border seams. In Photoshop we'll be using a free plugin called "Solidify C" from Flaming Pear Software, so before starting Photoshop please navigate over to **http://www.flamingpear.com/goodies.html** and download and install their free plugin pack, or just install Solidify C from that pack if you prefer.

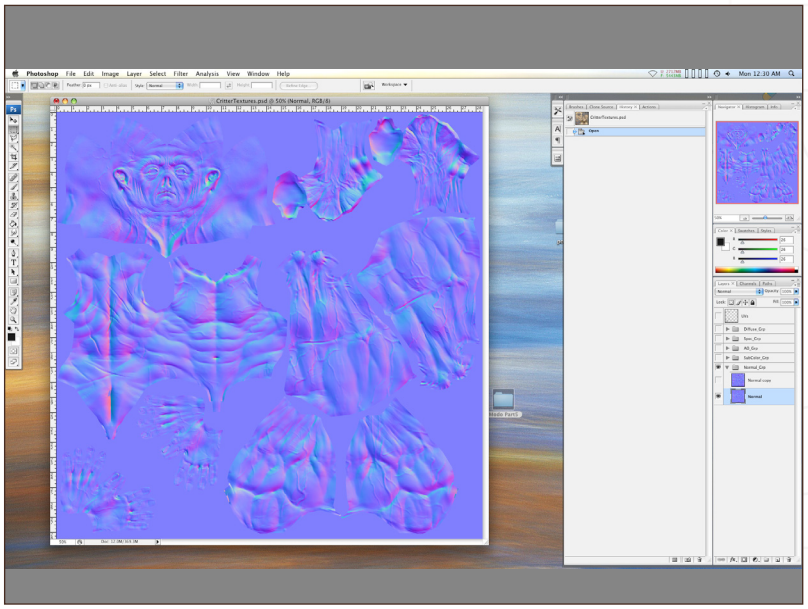
When ready, start Photoshop and open up the Normal, Ambient Occlusion, and UV maps. Create a PSD file with all the textures in separate layers, and then organize them into groups as well – Normal_Grp, AO_Grp, etc. Save the PSD file as "Creature_Textures.psd" (**Fig.16**).

Fig 16



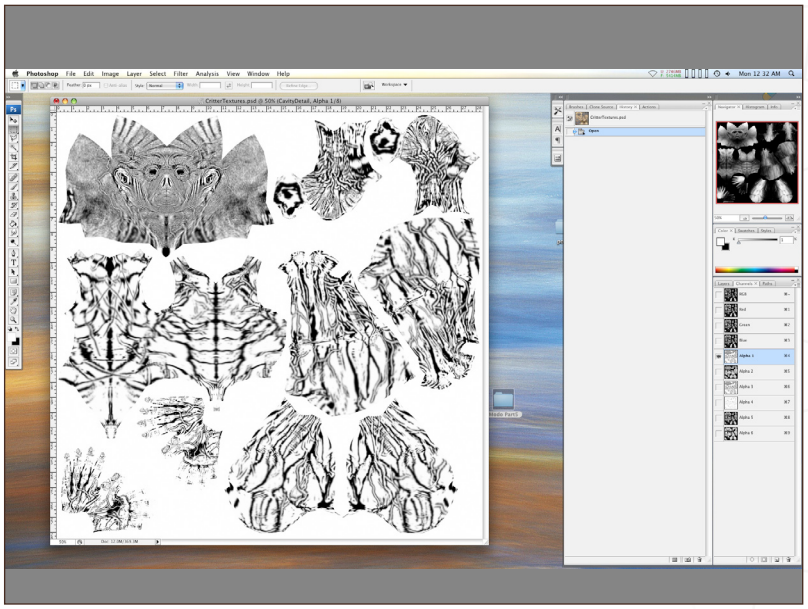
17. Starting with the Normal maps, select the one with the least amount of errors (or none at all). If the map has errors, cut and paste in parts from the other maps to create an image without any. Repeat this process for the Ambient Occlusion map (**Fig.17**).

Fig.17



18. Now we will use the CreatureCavity and CreatureCavityBlur maps to add detail to our Ambient Occlusion map. Since we are using the Ambient Occlusion as a texture base we need it to be as detailed as possible. When editing the Ambient Occlusion map think of it as a black and white photo of the high-res surface. I usually start by making an alpha channel from the AO and both cavity maps. Then, starting with the CreatureCavityBlur alpha, load it as a selection, invert it, and then fill a new layer with black. Set its effect to Soft Light (**Fig.18**).

Fig 18



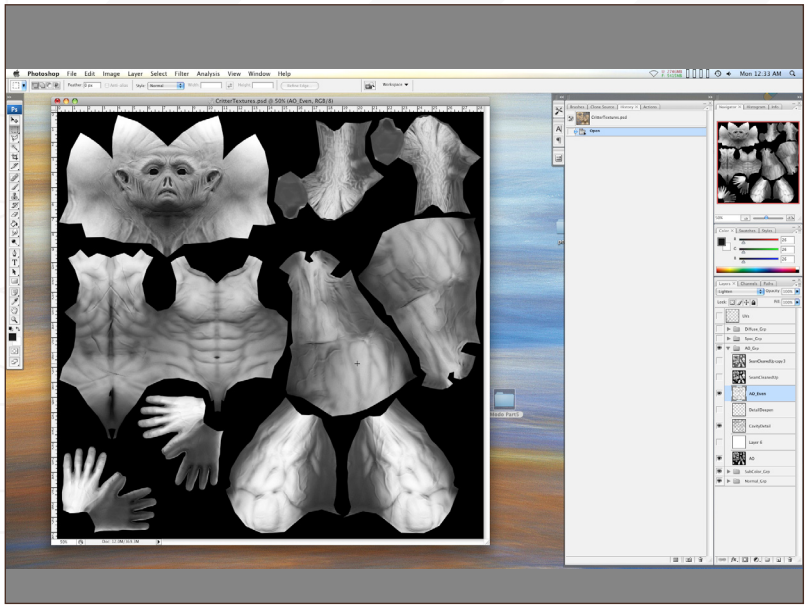


Fig 19

19. Next, create a new alpha using the AO map, and then use the Unsharp Mask to increase its contrast by around 90% with a radius of about 30 pixels. Load it as a selection, fill a new layer with white, and then set its effect to Lighten (**Fig.19**).

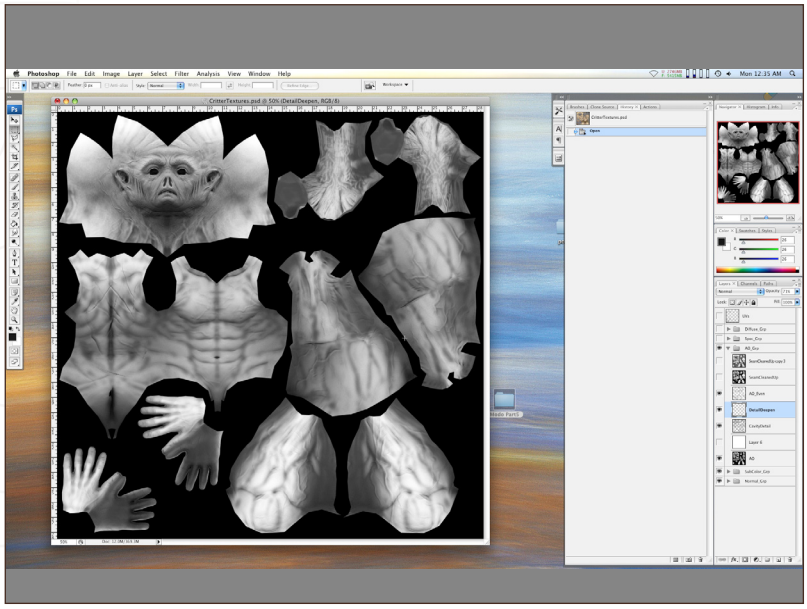


Fig 20

20. Now continue to use your alphas as a selection mask with the brush tool – this process is very similar to dry-brushing and color-washing where we try to highlight edges and deepen the crevices – to bring in the small, fine details. This process can be easily overdone, so it is important to be subtle.

I create two more layers: one for highlights on the highest peaks and edges, and another that shades in only the deepest creases. When each of the new detail layers is complete, reduce the opacity to 50-60% to help them blend into the base (**Fig.20**).

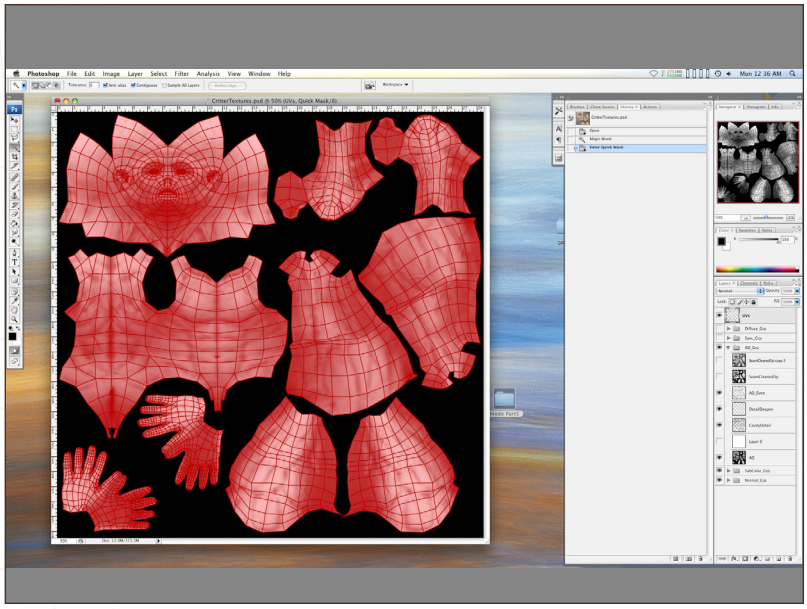


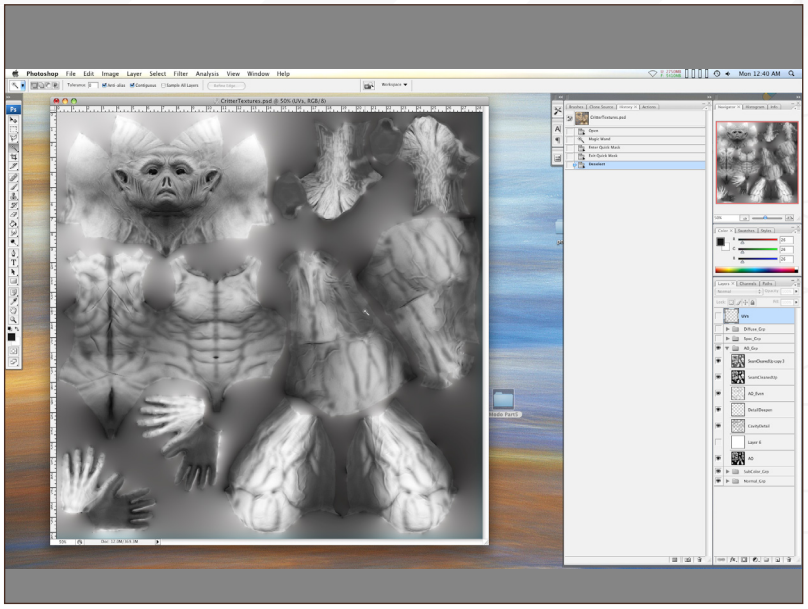
Fig 21

21. When we are satisfied with detailing, create a flattened copy of all the layers. We will now cleanup the texture UV border seams using Photoshop and modo's 3D Paint. We need to make sure the maps show no seams on the model at this stage since all of our texture maps will be derived from the Ambient Occlusion map as a base.

Duplicate the Normal and Ambient Occlusion layers, and then switch to the UV wire Image layer. Using the Magic Wand Tool, select the empty area between the UV shells, with Tolerance at 0, and Anti-aliased and Contiguous both active. Select any area that is not within a texture shell. Go to Select > Modify > Expand, and expand by 1 or 2 pixels. Save the selection as an alpha channel (**Fig.21**).

22. With the selection still active, switch to the upper duplicate of the Normal texture and use the selection to delete the space between shells (be sure the keep the selection active). Go to Filter > Flaming Pear > Solidify C. The operation might take some time but when complete all the UV borders will be expanded and blurred into each other. Repeat this process for the Ambient Occlusion map (**Fig.22**).

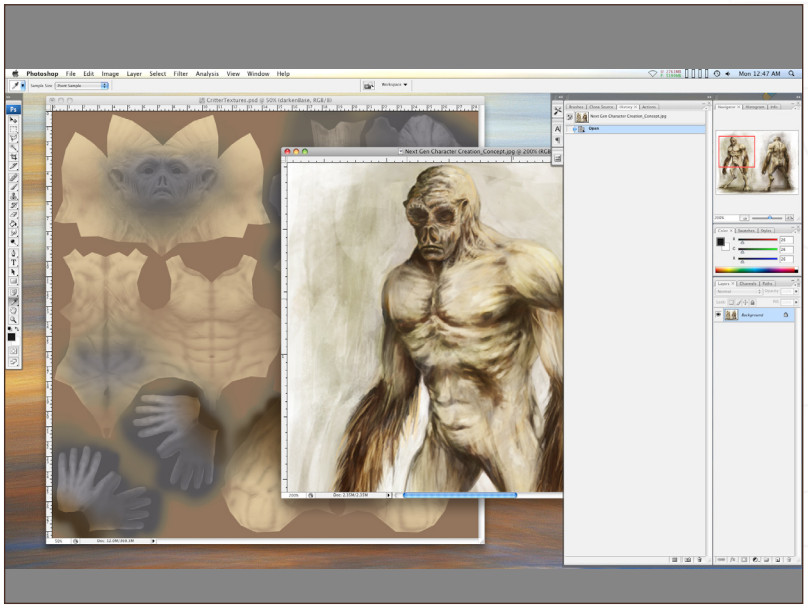
Fig 22



23. Create a new Group called “Diffuse_Grp” with a new blank layer. Now use the Eyedropper Tool on the concept art to get a sample of the overall color of the character – sort of a mustard color – and then use the Paint Bucket Tool to fill the blank layer.

Place a copy of the detailed Ambient Occlusion map into an alpha channel and use it to load a selection. Then on a new layer, use the Paint Bucket Tool to fill the layer with a very dark yellowish brown (RGB 37, 36, 36) on top of the base color, and change its effect to Color Burn with an Opacity of 40%. Using this as a guide, create a new blank layer of the base color and add some light grey and a darker reddish brown to the limbs and head (**Fig.23**).

Fig 23



Repeat these steps for the diffuse map, and then export each layer as a separate image saved as “Creature_Normal.tga”, “Creature_AO.tga”, and “Creature_Diffuse.tga”.

Fig 24



24. Open up the original UV-mapped mesh file in modo (the original pose) and turn on Linear UVs in its properties. With the mesh active, press M and assign a new shader to it, called “Creature_Shd”. In the shader properties, make sure the shader’s Smoothing Angle is set to 180 degrees, then add three texture layers and select the Creature_Normal.tga, Creature_AO.tga and Creature_Diffuse.tga as the image maps. Change the Normal layer’s effect to Normal, and leave the Ambient Occlusion and Diffuse layer effects as Diffuse (**Fig.24**).

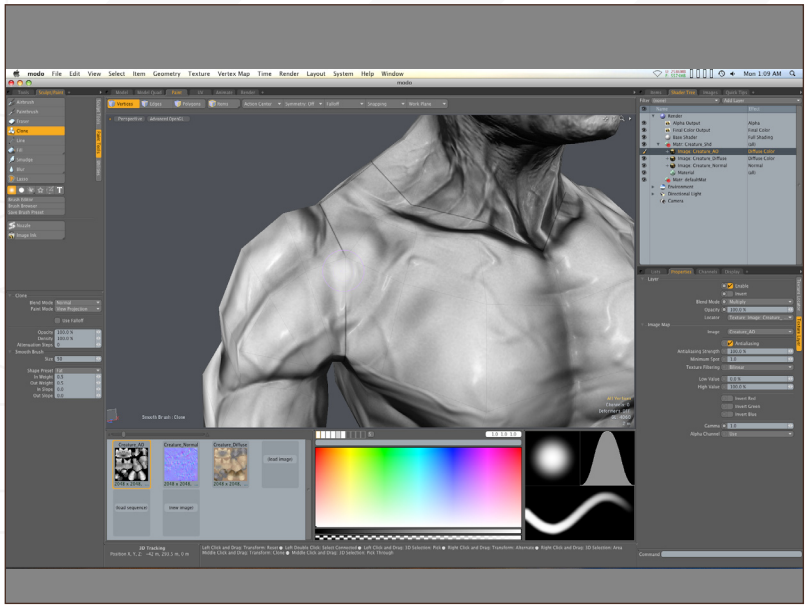


Fig 25

25. Switch to the Paint tab now and change the viewport setting from Advanced OpenGL to Texture. With the mesh layer active, select the Creature_AO texture layer. Now examine the mesh in the 3D Viewport – any seams along UV border edges will need to be cleaned up with the 3D brush and Clone tools. Start with a smooth Clone brush with the Paint Mode set to View Projection. The Clone brush works just like the one in Photoshop: Ctrl-click on a clean area next to the seam and then clone over any visible seams (**Fig.25**).

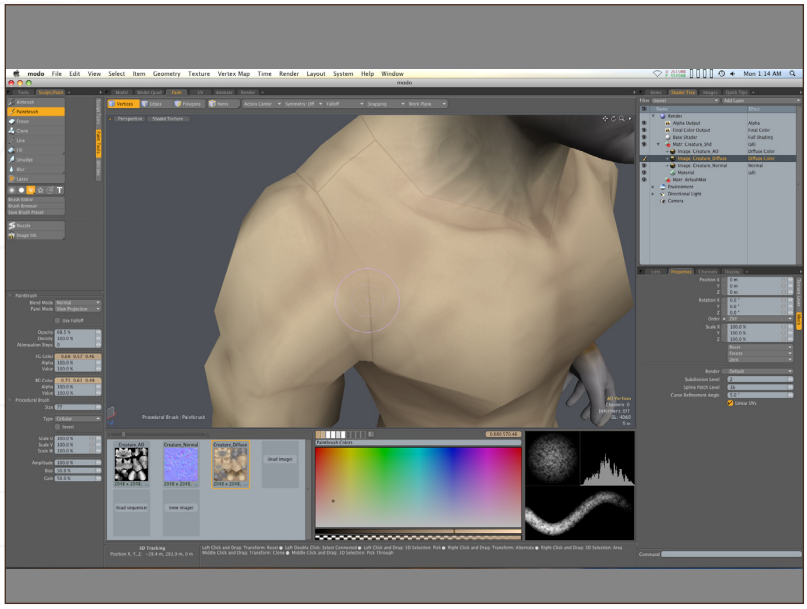


Fig 26

26. I also like to use the regular Paintbrush tool using Procedural Brush tip set to Cellular. With a brush tool active, use Ctrl-click to sample different tones from the surface to paint with, or even use the S key to switch between foreground and background Paintbrush colors (**Fig.26**). Make sure you save your progress by selecting Save All in the top file menu, as a regular save will not save the image map details you create.

Repeat this process now for the Diffuse map as well.

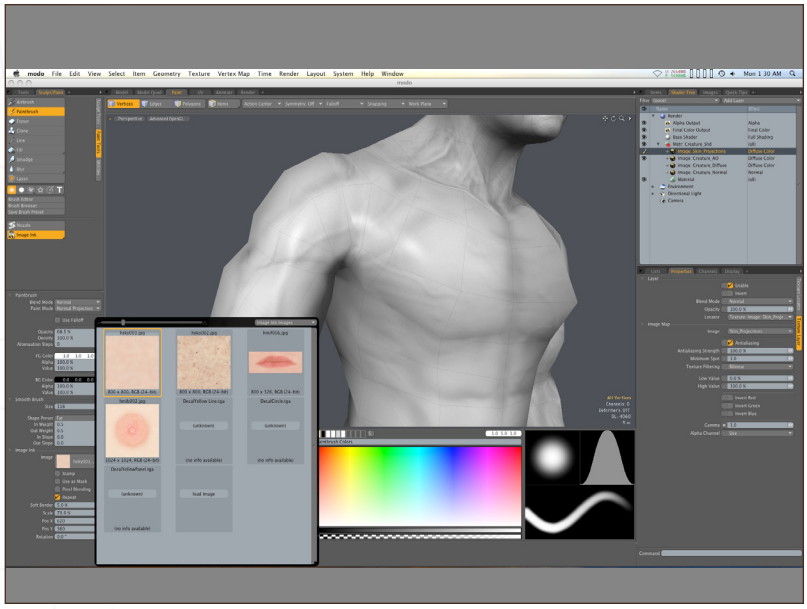


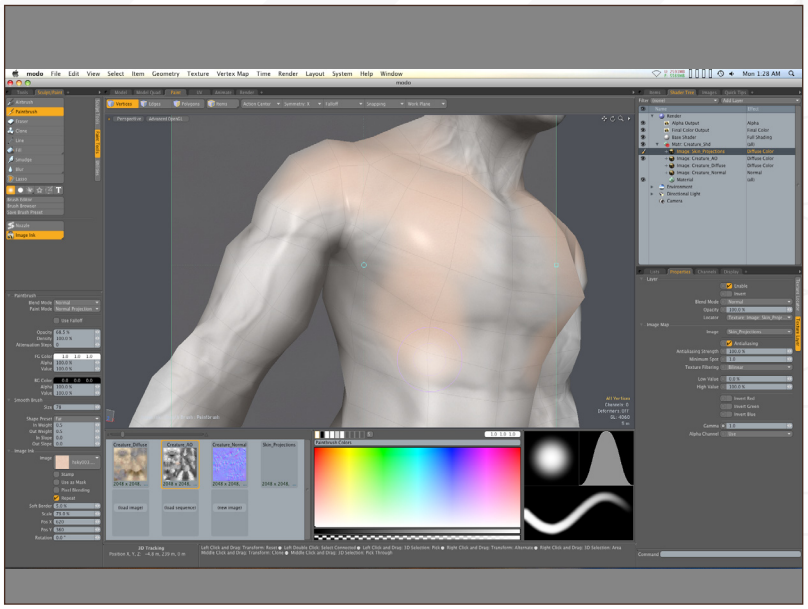
Fig 27

27. With the AO and Diffuse maps cleaned up we can proceed to create a color diffuse detail map base by projecting and painting some photo texture detail and procedural brushes. I'm using a few images from the **Total Textures Volume 04: R2 – Humans & Creatures DVD**, as well as an alpha from ZBrush. We will need a flat skin texture, some skin surface detail such as lips, nipple, scar tissue, a foot-hoof texture, and bone. Make sure the images you use are all square (**Fig.27**).

If modo has trouble displaying all the layers, you might be running out of video memory, so turn off visibility for the various layers as needed.

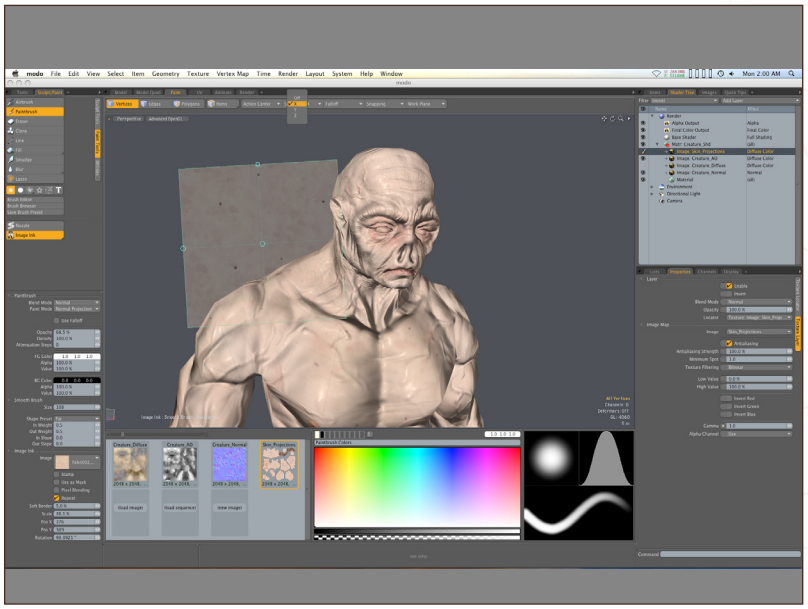
28. Create a new Diffuse Color layer and texture – save it as “Skin_Projections.tga” in your material group. Then select a soft brush with Image Ink, and use the Image Ink browser to load in the flat skin texture you selected to use (**Fig.28**). Leave the setting at default and then resize the texture image in the viewport to adjust the image to fit the area yo u will apply the texture to.

Fig 28



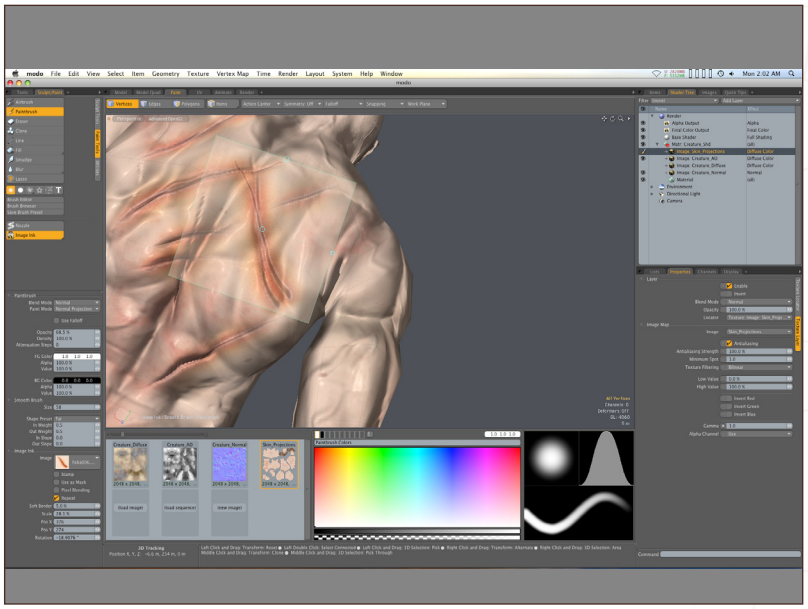
29. Be aware that the larger the image is in the viewport, the higher its resolution is, so it’s best not to scale the image down too small. Use the Paint Mode Normal or View Projection with a soft brush to apply the skin texture over the body’s surface, trying to keep the distribution even (**Fig.29**). You can also turn on the top Symmetry X button to help speed up the painting process.

Fig 29



30. Now select the other images and apply them to the model by aligning the image over the desired location and brushing the image to the surface. Keep the image perpendicular to the surface location and apply the image using one brush pass; if you get any blurring or stretching, just reposition your image for a better angle and patch the area over (**Fig.30**). Repeat this process for the other details and images on the body, head hands and hooves.

Fig 30



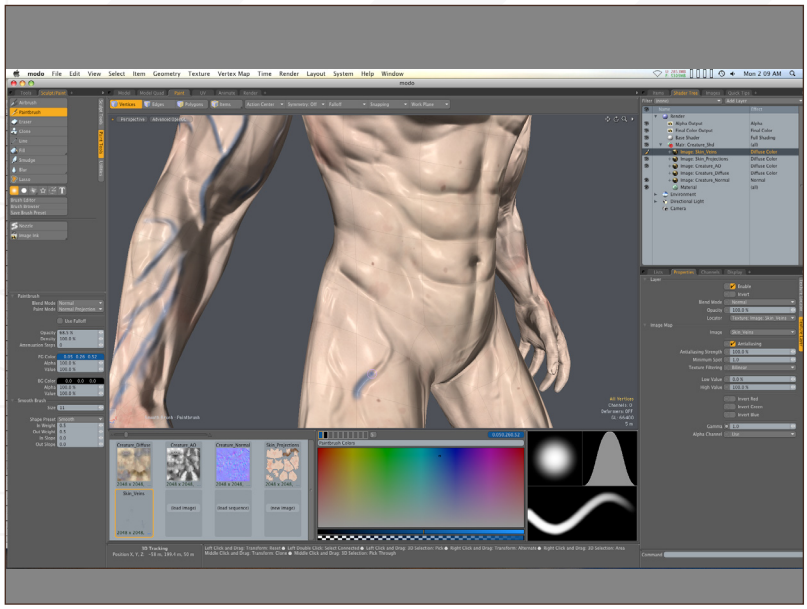


Fig 31

31. Now we will use modo's various brushes to create a layer with vein colors and some skin coloration. We will create a new Diffuse Color layer and texture; save it as "Skin_Veins.tga". Rather than using the existing texture we will flatten the separate images together later in Photoshop.

Turn on Advanced OpenGL in the viewport and the effect of the Normal Map will be active. Using the surface detail as a guide, apply some thin blue lines where the view detail is. You can also add a few extra veins as needed (**Fig.31**).

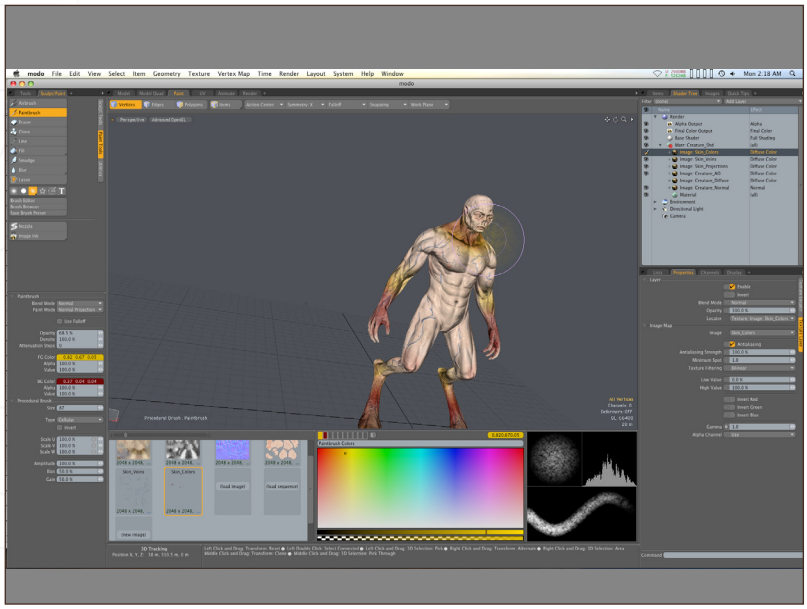


Fig 32

32. Create a new Diffuse Color layer and texture, save it as "Skin_Colors.tga" then select the Procedural Brush setting. Now sample the base skin color and tint it towards a deep red. Apply the red to the ends of the limbs and around the neck, and then switch the color to a yellow and apply that color to the borders of the red areas – similar to what is shown in step 29 (**Fig.32**). Again, make sure you save your progress by selecting Save All in the top file menu.

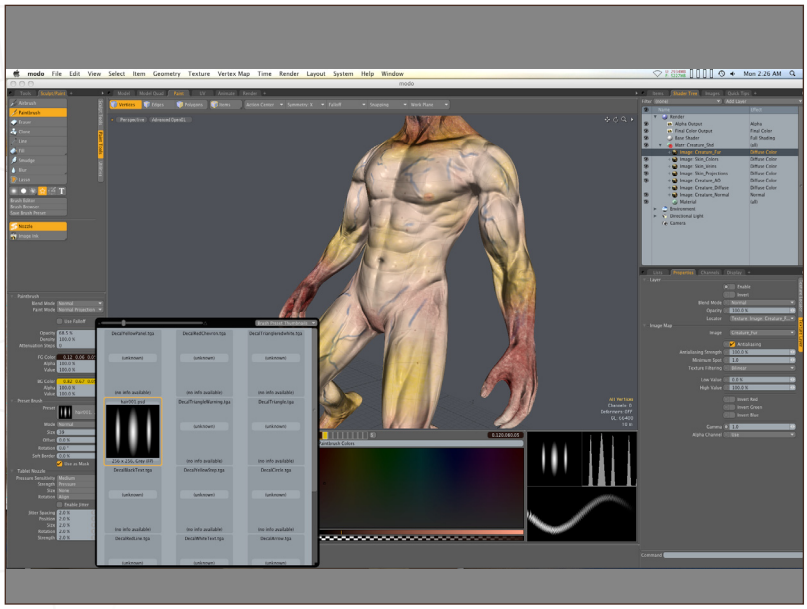
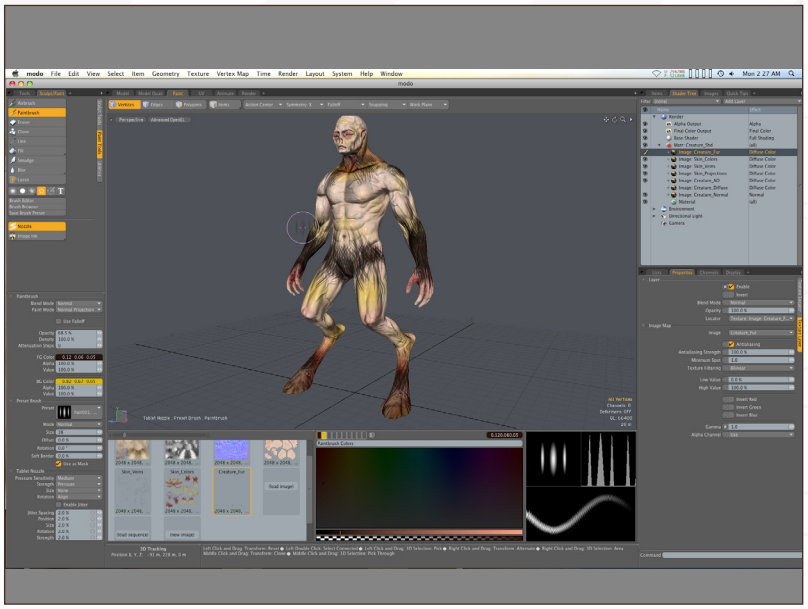


Fig 33

33. The next step will be to paint the base color and texture for the long fur on the forearms, and some light fur on the lower legs, waist and around the shoulders. Again we will use a separate Diffuse Color and texture, saved as "Creature_Fur.tga", so go ahead and create a new layer. Using the Paintbrush we will select the Preset Brush setting and then load up the 3-slash ZBrush alpha using the Preset menu in the brush options panel. Turn on Use as Mask. Select Nozzle and make sure Rotation is set to Align (**Fig.33**).

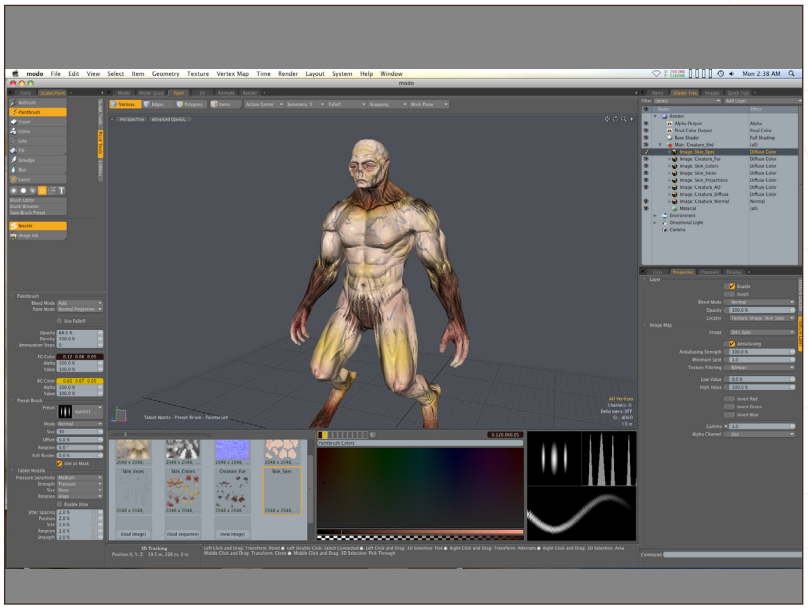
34. With the brush setup, select a dark brown color similar to the fur color in the concept and start by filling in a base color on the forearms. You'll notice that with the Align setting on, the brush always aligns along the path of the stroke, so it makes it fairly quick and easy to paint fur or hair. Once the color base is done, change the brush's Blend Mode from Normal to Color Burn, then start to add the fur shading for the edges and hair clumps, keeping in mind that we wish to create something that looks like short animal fur (**Fig.34**).

Fig 34



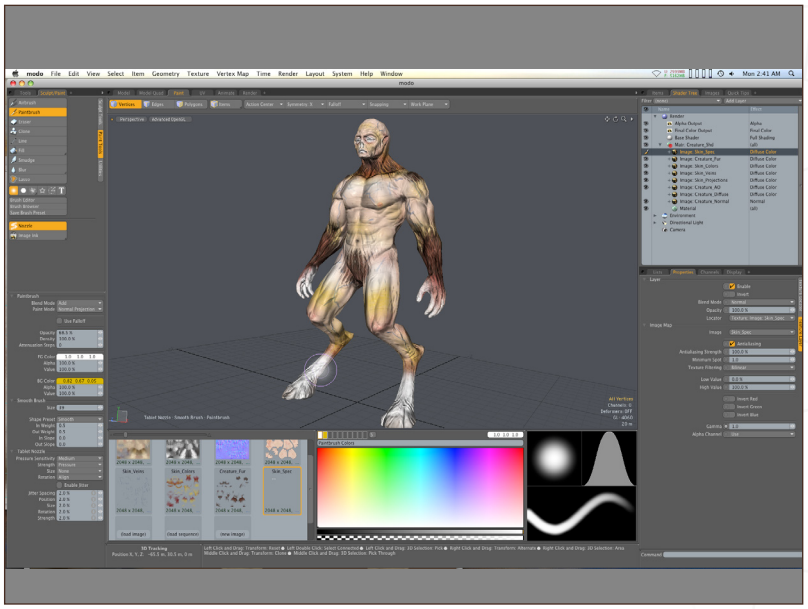
35. Once you're satisfied with the shadows, change the brush's Blend Mode to Add to create some highlights (**Fig.35**). Again, make sure you save your progress by selecting Save All in the top file menu.

Fig 35



36. In the last step in the painting process we will paint some white in areas that would be glossier or have a higher specular value than other areas. Since the concept is a creature with fur, those areas will be limited to around the eyes, mouth, palms of the hands, and hooves. Once again, create a new map and save it as "Skin_Spec.tga". Select a soft brush with white and apply some white to the areas indicated. We will use this texture to adjust the specular map that will be created in Photoshop. Save your progress by selecting Save All in the top file menu (**Fig.36**).

Fig 36



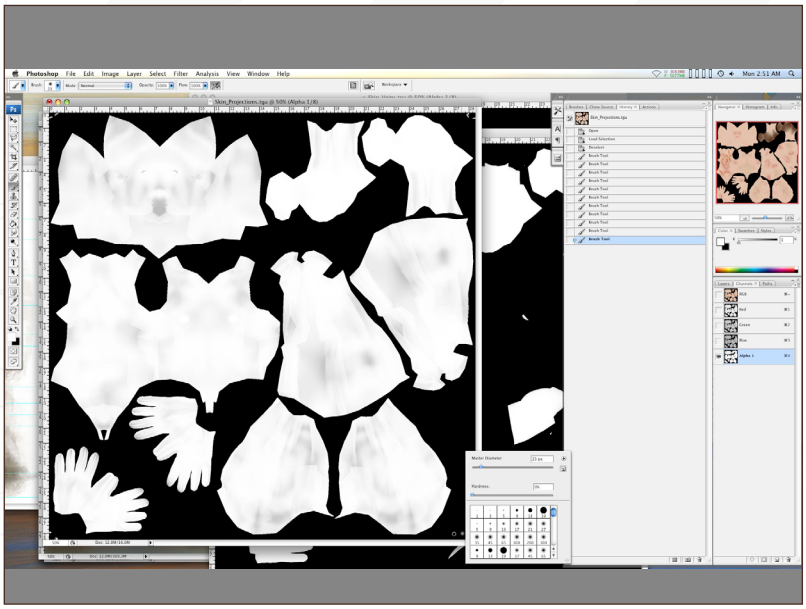


Fig 37

37. We finally have all the source images and maps we need to complete our textures. In Photoshop now, open the Creature_Textures.psd and open up the cleaned-up Creature_AO.tga, Creature_Diffuse.tga, and the new maps we created in modo. Each texture we created has an alpha channel that we will use to extract the painted texture and place it into the Creature_Textures.psd file. To make sure all images align when imported, paint a small white dot or mark at each corner edge of the alpha, then load the alpha and use it to copy and paste the color data into a new layer in the PSD file (**Fig.37**).

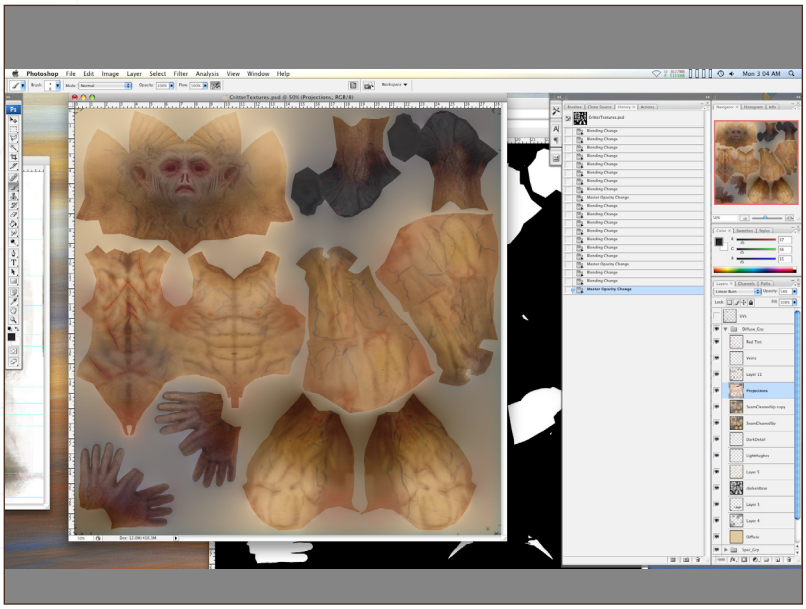


Fig 38

38. Place the cleaned-up Creature_AO.tga in the AO_Grp group; the AO is now complete. In the Diffuse_Grp group, place a copy, from bottom to top, of the cleaned-up Creature_AO.tga, Skin_Projections, Skin_Colors.tga, Skin_Veins.tga and Creature_Fur.tga (**Fig.38**).

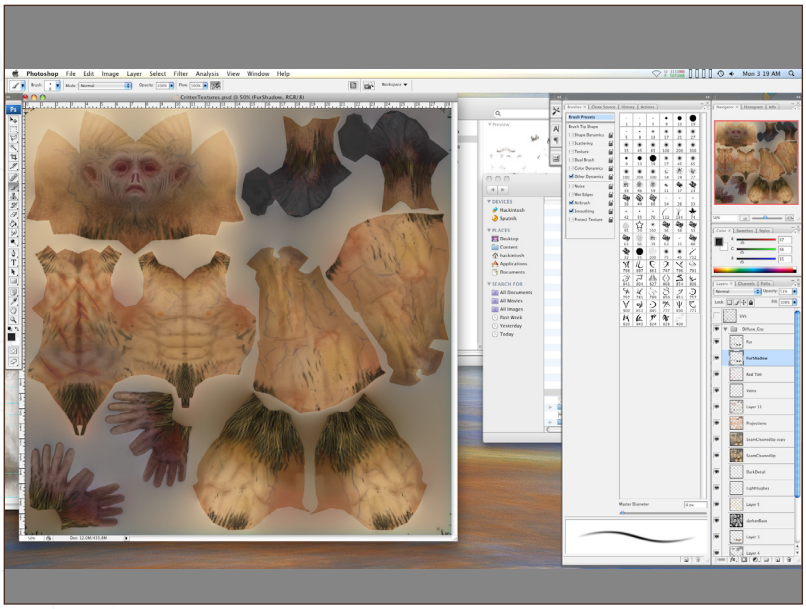


Fig 39

39. Change the effect of Skin_Projections to Linear Burn and change the layer's Opacity to about 50%. Change Skin_Colors to Multiply and change the layer's Opacity to about 50%. Set Skin_Veins to Soft Light. For the fur layer, adjust the Hue/Saturation to match the fur in the concept art, and we will then add a small shadow at the edge. Start by creating a duplicate, then in Levels drag the Output Levels all the way to the right; change the color data to black, blur the layer by about 2-4 pixels, change the layer's Opacity to 50%, and place it below the original fur layer (**Fig.39**). The Diffuse map is now complete.

40. We need to update the Normal map with a matching fur texture. Duplicate the imported fur layer, place a dark background behind it, and then merge them. We now need to run the Nvidia Normal Map Plug-in in Photoshop (or the Normal Map Generator application for Mac OS X). Place the resulting Normal map with the layer set to Overlay onto the base body Normal map. Now we will create the Specular map using the Diffuse map as a base. Make a copy of the Diffuse_Grp and rename it “Spec_Grp”. Desaturate all the layers within the Spec_Grp. Open the Skin_Spec.tga and use its alpha channel to copy and paste the white color into the Spec_Grp group, and then change its Opacity to 50% and the layer effect to Overlay. Finally, invert the Skin_Vein layer to help highlight the veins (**Fig.40**).

Fig 40

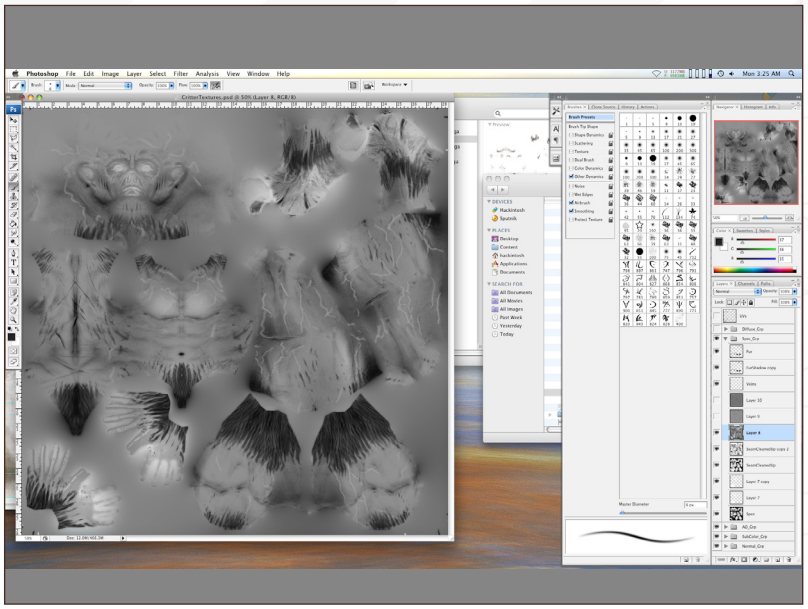
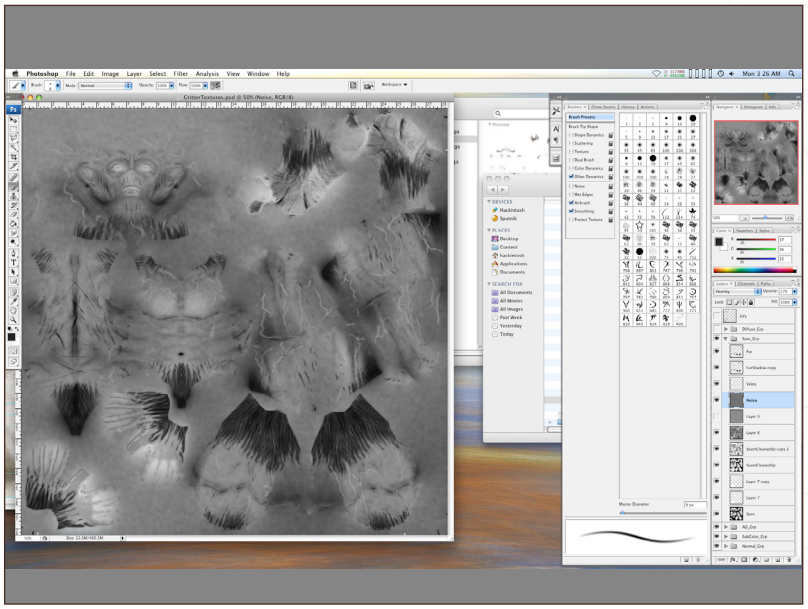
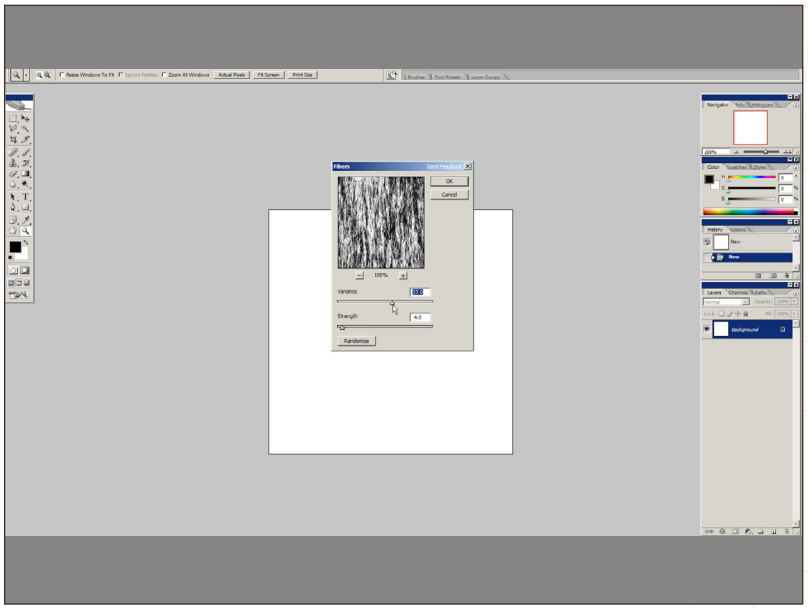


Fig 41



41. Now we will adjust the overall map so the specular is more even. Create 2 new blank layers at the bottom of Spec_Grp and fill both with 50% grey. In the upper layer, use the Add Noise Filter set to 400%, Gaussian and Monochromatic. Run Gaussian Blur set to 4 pixels, and then change the layer’s Opacity to 30%. Select the Diffuse layer and set its Opacity to about 30% (**Fig.41**). This will complete out Spec map and all the textures for the Body. Make sure you safe the PSD with all layer intact and then merge each group and export out each layer as a separate image to load into Modo.

Fig 42



42. Moving onto the eye texture now, create a new document with a width and height of 512 pixels. Create a new layer. Click on Filters > Render > Fibers and choose a reasonably high variance, a small strength, and then click OK (**Fig.42**).

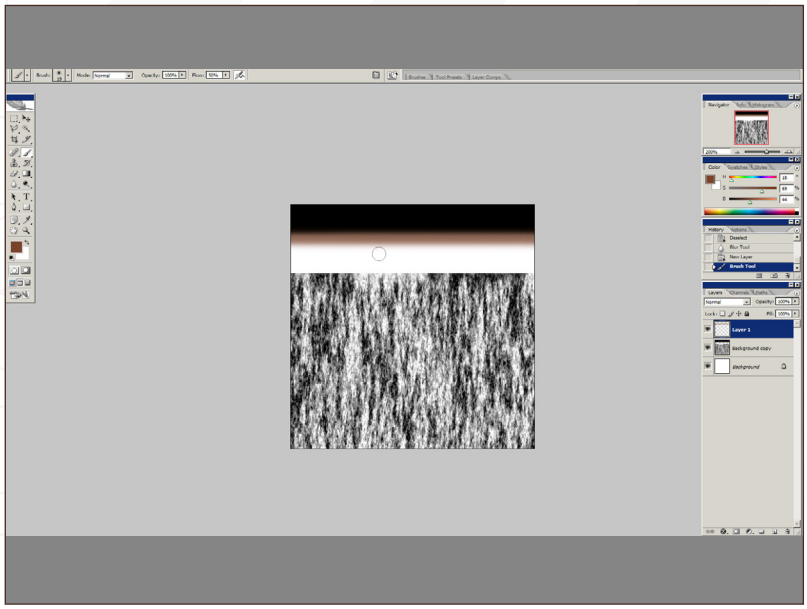


Fig 43

43. The Fibers filter is a quick way of creating some random streaks of noise that look somewhat organic. Create another new layer. Use the Free Transform tool to scale them down vertically from the top, and now, in that gap, paint a large line of black to be our pupil, and a smaller line underneath of brown (**Fig.43**).

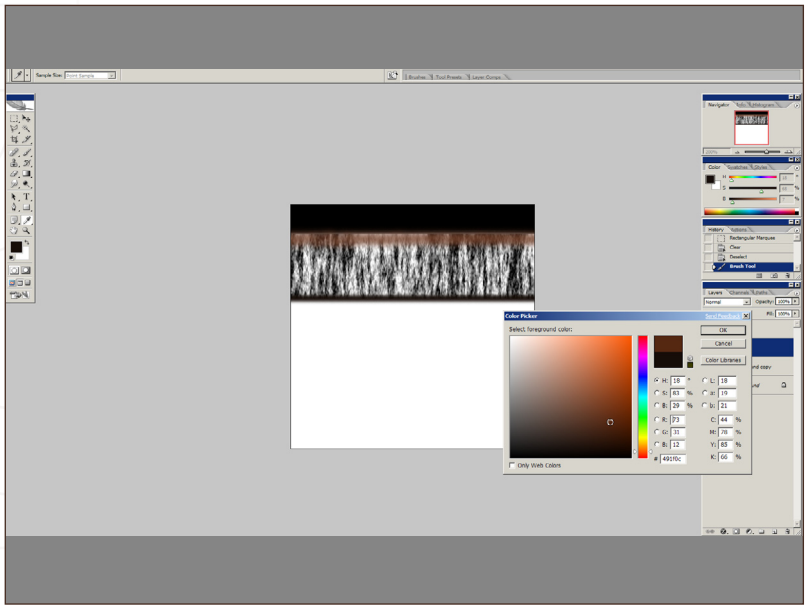


Fig 44

44. Use the Free Transform tool again to scale up the fibers and draw a darker line at the bottom of them (**Fig.44**).

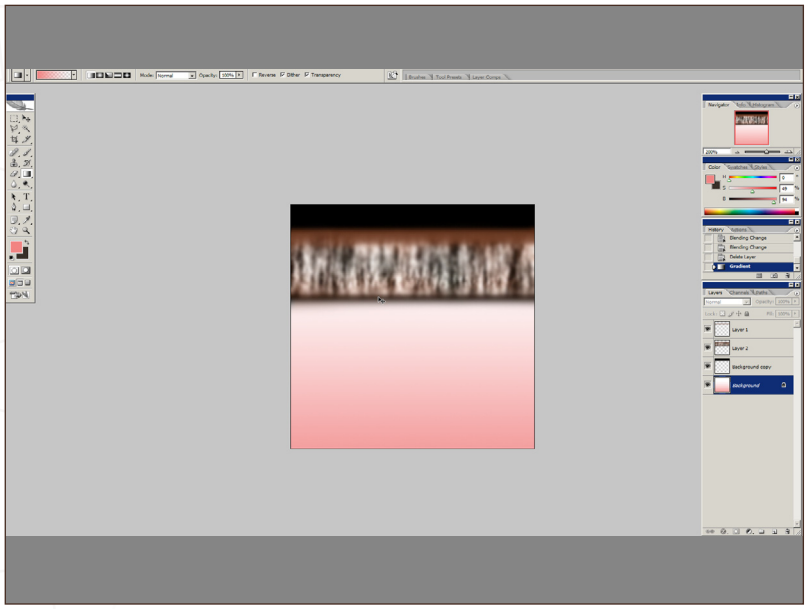
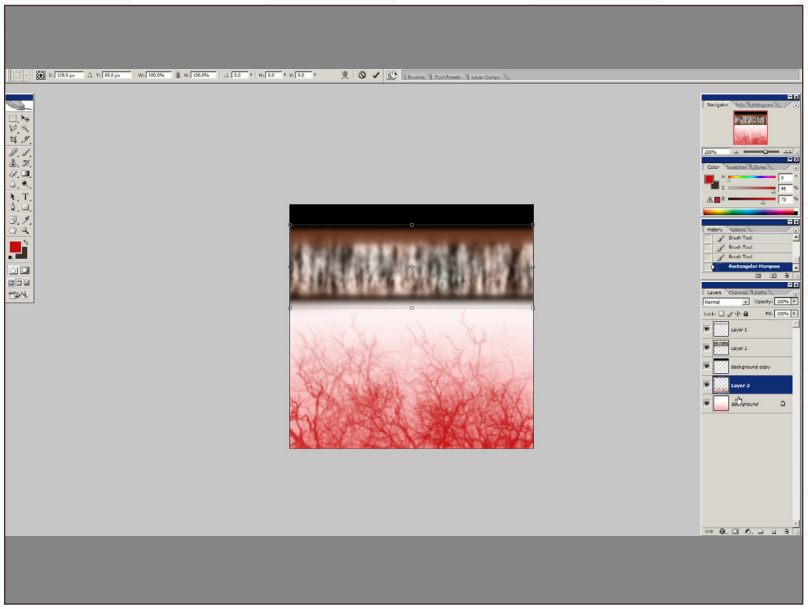


Fig 45

45. Select the layer with the fibers on and blur it considerably. On the background layer choose a pinkish foreground color and create a gradient from top to bottom – the bottom being the pinkest and the top being white (**Fig.45**).

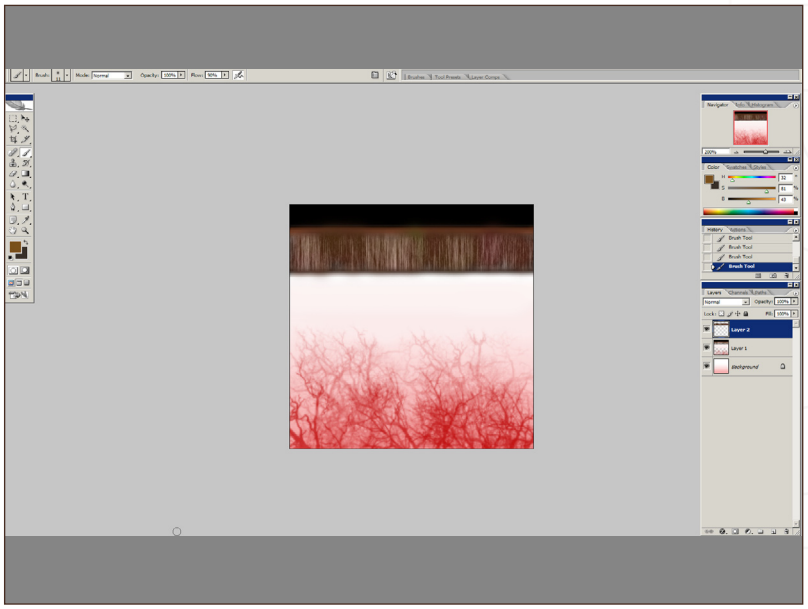
46. Create a new layer above the background layer. Choose a deeper red and, using our vein brushes, scatter some veins around – the bottom containing the most veins and the top the fewest. Merge the lines and fibers layers and use the Free Transform tool to scale them vertically slightly (**Fig.46**).

Fig 46



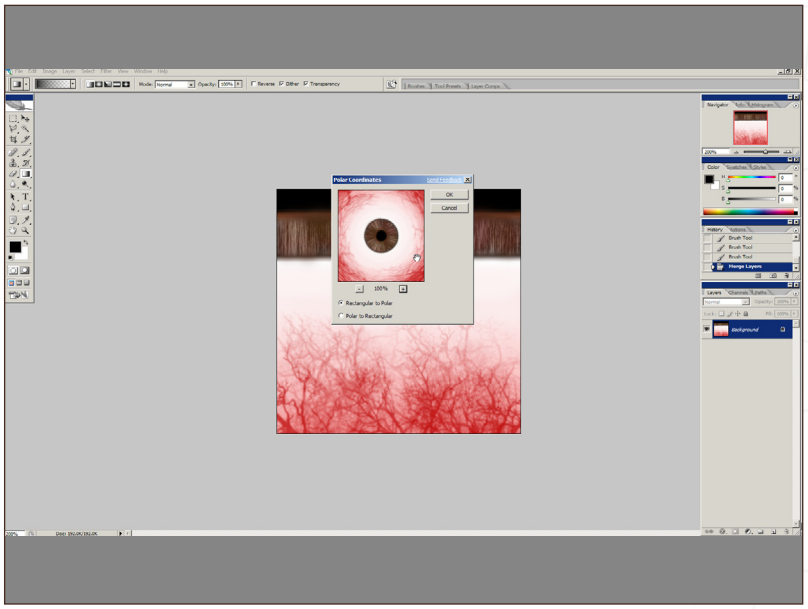
47. Now with the fibers section scaled, retain the selection, and in a new layer create additional fibers. We can reduce the contrast of these and use a layer blending mode to put back some of the sharpness. Using the paintbrush, hold down Alt, right-click over the texture and choose Color. With this mode enabled you can paint over your image altering only the color, without painting over any of the details. Give a little randomness to the fibers' colors now (**Fig.47**).

Fig 47



48. Now we've created a simple map for our eyes, which we can go into more detail on later if we wish. Something of this caliber usually will suffice when the texture resolutions for eyes are considerably small, because they do not take up too much resolution on screen. Merge all of your layers together by selecting the top layer and going to Layers > Merge > Visible. Now with the layer selected, go to Filter > Distort > Polar Coordinates and make sure the setting is on Rectangular to Polar; click OK (**Fig.48a – b**).

Fig 48a



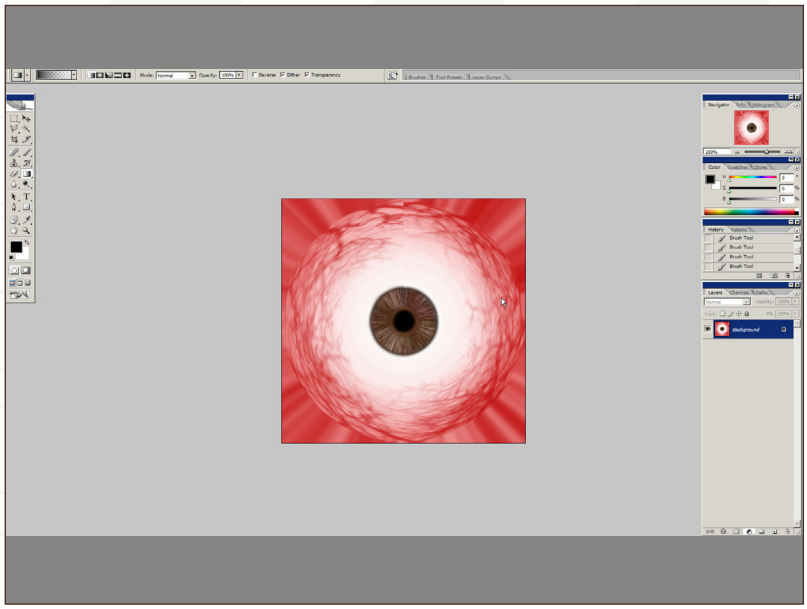


Fig 48b

49. Generally, apes' eyes are somewhat darker and orangeier than humans', so let's paint that now. Create a new Saturation layer and tint the texture orange. Then paint a darker orange color in a new layer above that, and set the layer blending mode to Linear Burn (**Fig.49**).

50. Create layers above that to darken and add volume to the eyeball texture. You can also paint a ring around the iris in black and apply a strong Gaussian Blur filter to this, and reduce the Opacity a little. This gives the effect that the iris is actually a separate object underneath the cornea, the black ring simulating the shadow cast. Save off this file now as our eyeball texture (**Fig.50**).

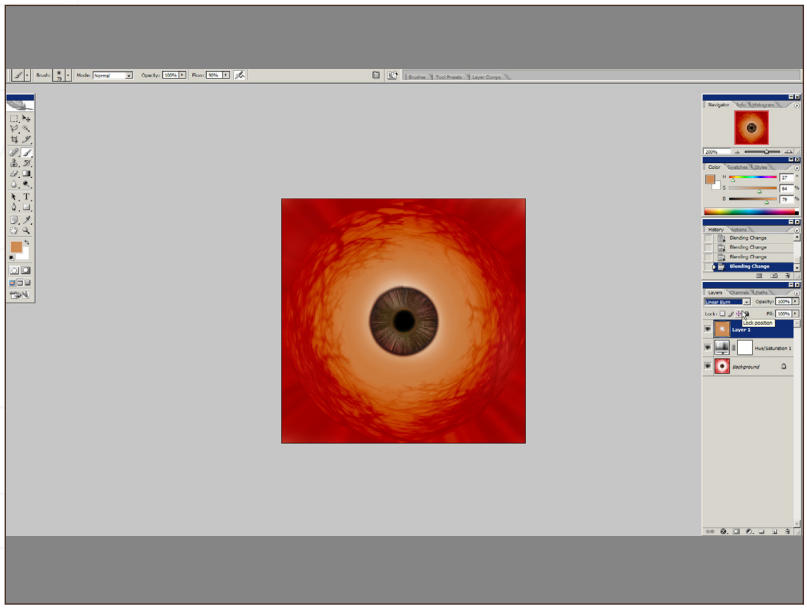


Fig 49

We finally come to the end of the texturing process. We've created the majority of maps necessary for building a realistic and professional shader. The texturing process can sometimes be long and arduous, but with the techniques we have used here it can be quick, efficient, non-destructive, and manageable. In the next installment we will create a basic 3-point lighting rig and an advanced character shader, along with hair and eyes. We will also look to complete our character with some accessories and a weapon.

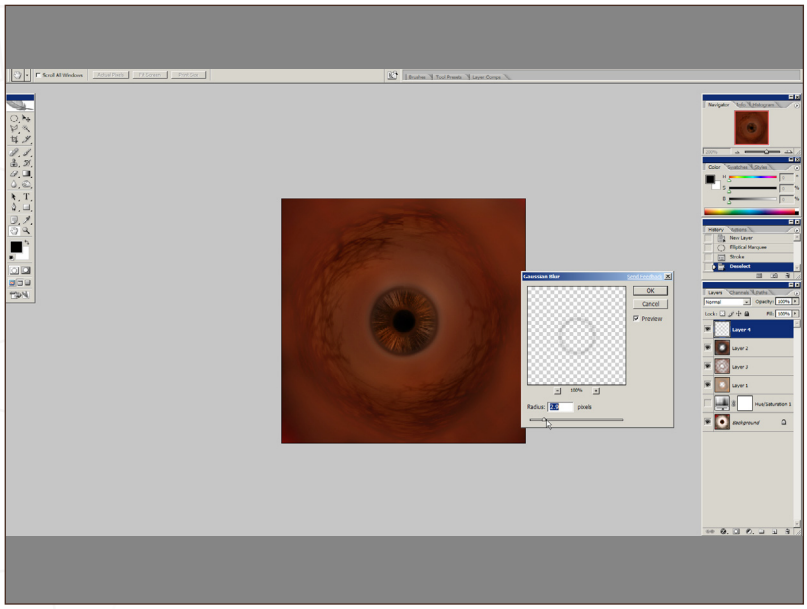


Fig 50

Creature Concept by: Richard Tilbury
Tutorial originally created by Joseph Harford in ZBrush & 3ds Max; translated by John Hayes for modo

Tutorial by:
JOHN HAYES
For more from this artist visit:
http://zugok.cgsociety.org/
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